THE TEXTILE MANUFACTURER

No. 1029. Vol. 86 Two Shillings and Sixpence September, 1960

Notes of the Month

COURTAULDS' PLANS

COURTAULDS' group profits of £21,044,043 this year, the highest in the history of the company, reflected a year of active business in nearly all parts of the group and some 70% of the assets and 60% of the profits of the group were attributable to activities in the textile industry. At the recent annual meeting shareholders were asked to approve an increase in the authorised capital of the company making £100 m. in ordinary shares and £23 m. in preference shares. Shareholders were also asked to approve the recommendation of the board that by a capitalisation of reserves £1 of ordinary stock should be issued as fully paid for every £3 of ordinary stock held on June 20. In his statement, Sir John Hanbury Williams, chairman, said the effect of this would be that, excluding about 114,000 stock-units to which co-partners would become entitled this year under the co-partnership scheme, the issued capital would be: ordinary stock to £78,871,395 and preference stock £17,512,500

On the subject of European free trade, Sir John said he well realized that the European Common Market and the European Free Trade Area involved changes that could not be made without disrupting some well-established channels of trade. He also appreciated the political problems. Nevertheless, as an industrialist he sincerely hoped H.M. Government and the other governments involved would find solutions which would lead to this country being in far closer trading relations with all the other countries of Europe, the Six as well as the Seven, so that the industry of this country could take part in the overall expansion which would result. He also trusted they would heed the advice of industry on steps which could alleviate, if not avoid entirely, the immediate difficulties both for the industry of this country and for the Commonwealth.

However, continued Sir John, the company could not afford to await the outcome of complex negotiations by governments. "We have long been building up our investment in the Commonwealth, and we have also been increasing our interests in Europe," he said, and mentioned the company's new developments in France in the manufacture of "Courtelle", and in Germany for the manufacture of carbon disulphide. In Italy they had recently decided to strengthen their position still further by participating in the forthcoming increase in share capital by Snia Viscosa. Regarding future prospects, Sir John pointed out that it was too early for the company as commodity producers to gauge how far recent action to restrict credit might affect their business. If the good overall results for the past financial year were maintained for the current year, then it was a reasonable expectation that the board would feel able to recommend allocating to dividends a total sum somewhat greater than that recommended for this year. It would be appreciated, he said, that he could not forecast at this time what rate of dividend would be recommended on the increased capital.

The company's annual report stated that the improvement in the demand for continuous filament viscose yarns has been well maintained throughout the year, partly due to a wider appreciation of fabrics of viscose yarns in new uses and confirmation of their applications in older uses. The demand for high-tenacity viscose yarns for the tyre trade was now at a record level. An even stronger yarn was expected to be available in small commercial quantities before the end of the year, and a still stronger one had been produced experimentally in the research laboratories. Early in the year, the demand for "Fibro" took a sudden upturn and substantially increased quantities of viscose staple were delivered for traditional types of carpet, in addition to satisfying the requirements of the rapid development of the tufted carpet industry. Sales of solution dyed staple "Fibro-Duracol" reached a new peak and substantial headway had been made in securing the acceptance of blends of "Fibro" for use in textiles for government and other public services, such as transport and hospitals. Research efforts towards improved staple continued. In particular, fibres which gave fabrics improved dimensional stability were being developed and it was hoped development samples would be available to the trade during the year.

"Tricel" continuous filament yarn had shown a very satisfactory increase in sales, and "Dicel" yarns had shown a modest increase. Smaller sales of "Celafibre" ("Dicel" staple) had been more than compensated by the increase in "Tricel" staple where present capacity was fully committed. Acceptance by the public of garments and fabrics made from "Courtelle" had been most encouraging. Sales of "Fibrolane" had been maintained and an improved quality, introduced under the name of "XL", had satisfactory wet processing and dyeing properties and was not susceptible to soiling. This factor, together with its good resilience, made it attractive for blending into carpet yarns. The research departments continued very active and the laboratories of the parent company had been vitally concerned with the launching of "Courtelle" and had helped to solve many of the problems that had appeared as its end uses were widened. Substantial progress had also been made in improving the properties of viscose yarns and staple fibres, either by changes in the fibres themselves or by new after-treatments. The main objective was to increase the strength of the cellulosic fibres, and also to impart to them the properties of easy-care—which was a characteristic trend in modern textiles. Further steps had been taken to integrate the research departments of Courtaulds and British Celanese with a view to the latter concentrating on petrochemicals. Construction of a number of petrochemical pilot plants at Spondon was under way and a new laboratory was being planned there. At the end of April Courtaulds and British Celanese employed in the U.K. more than 33,000 men and women.

WOOL ACTIVITY AND EXPORTS

ACCORDING to a recent report by the Wool Textile Delegation activity in the wool textile industry in the first half of 1960 was quite satisfactory and the labour force was fully engaged. In some sectors production did not reach the levels of the first half of 1959, but the latter was a period of peak activity in the industry. Following the trade recession of 1958 there was a rebuilding of the industry's stocks of semi—and fully—manufactured products last year and this continued in the early months of 1960. This movement now appears to have terminated and in the last three or four months there has naturally been a levelling-out of the industry's machinery activity. Wool stocks held in the industry are very low at the moment, being nearly 40 million lbs. less than at this time last year, most of the reduction having taken place in merino wool. On the other hand, stocks of tops (combed wool) remained high and at the end of June amounted to nearly 72 million lbs.

A noticeable feature of the figures for the first half of 1960 was the large quantity of man-made fibres consumed in the worsted sector. The weight used was actually a record, but to put this in its right perspective it should be pointed out that consumption of man-made fibres in the industry as a whole represented 11% of total fibre usage in the first six months of this year. Another point of interest is that total deliveries of worsted yarn exceeded the very high level attained last year. Demand for yarns for cloth and carpet manufacture, as well as for knitwear, resulted in this excellent performance. Production of cloth has been well maintained at about the same rate as in January-June, 1959.

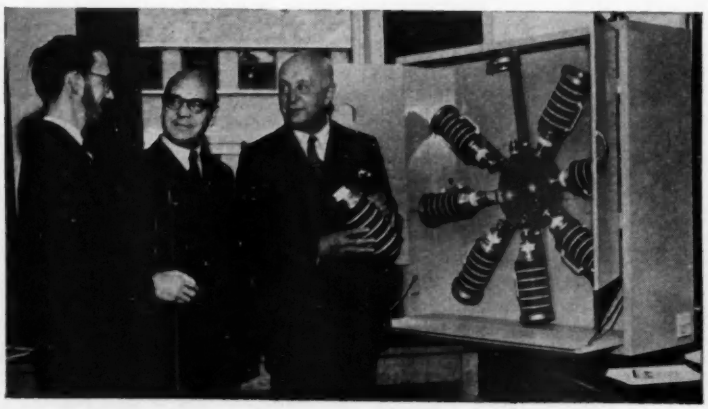
QUALITY CONTROL VITAL IN TEXTILES

LIKE other companies whose customers were in the textile industry, Shirley Developments Ltd. felt the effects last year of the implementation of the reorganisation scheme for the cotton industry, said Sir Raymond Streat, chairman, when addressing the recent annual meeting of the company. However, now that all the vital decisions rendered necessary by the reorganisation scheme had been taken, firms in the industry were increasingly ready to listen to representations about new devices and machinery and weigh-up their possible advantages.

Reviewing the activities of the company, Sir Raymond said that amongst spinners, the roller eccentricity testers continued to be popular as did the roller vibration detector and R.S. Meter—all devices whose regular use contributed directly to yarn quality. Finishers and users of cloth bought many crease recovery testers and stiffness testers—both instruments essential for controlled fabric quality. During the year over 150 fibre section kits were sold and deliveries of the new model of the "WIRA" cotton fineness meter, now supplied calibrated in micronaire units, began late in the year. This improved model aroused considerable interest amongst brokers as well as spinners. Manufacture had also started on an improved version of the "Shirley" X-type viscometer which is so widely used for quality control in bleaching.

Collaboration between the company and the other textile research associations continued to grow. "More and more we are coming to recognise the fundamental unity of the textile industry" said Sir Raymond, "although of course each section necessarily differs from others in its processing techniques to suit the particular fibres it uses—and it is desirable for the industry as a whole that the results of its research should not be unduly compartmented." Actively receiving attention at present were a number of useful instruments or devices, the sale of which had been entrusted to it by other Research Associations. Amongst these was the "LACRA" wash tester developed by the Lace Research Association as a simple and inexpensive way of carrying out controlled wash tests; a constant tension winding machine developed by the British Jute Trade Research Association to test yarn rapidly for weak places; and accessory equipment for fluidity testing developed by the Linen Industry Research Association. More recently the Hosiery and Allied Trades Research Association had asked the company to undertake the marketing of a number of its instruments and quality control devices.

Encouraging progress had been made with the new model of "Shirley" automatic size box and Sales were more than double compared with the previous year and continued to increase rapidly. The company's licensee had a most satisfactory order book for the "Shirley" opener and "Tweedales-Shirley" hopper opener. The "Shirley" pressure point system had gone from strength to strength and the company's own confidence in it, which was confirmed of course by the Factory Inspectorate at an early stage, had been amply justified by the results obtained in scores of mills where it had been installed.



Mr. H. Wyn Griffith (manager, Shirley Developments), Mr. W. Crossley (Yorkshire Dyeing and Proofing Co. Ltd.) and Sir E. Raymond Streat (chairman, Shirley Developments) discuss the new "LACRA" wash tester

Mr. T. M. King (Shirley Developments) discussing the new Timothy Eaton photo electric weft detector with Mr. J. L. Butterworth of Ash Spinning Co. Ltd., Shaw. Considerable savings are reported when weaving coarse yarns because the waste on each pirn is cut down

Features in a New Spool Axminster Setting Frame*

Platt Bros. latest MAS.1 model has been designed to achieve three important objectives : (a) an appreciable reduction in spool waste, (b) more carpet woven from a setting and (c) less mending required after weaving

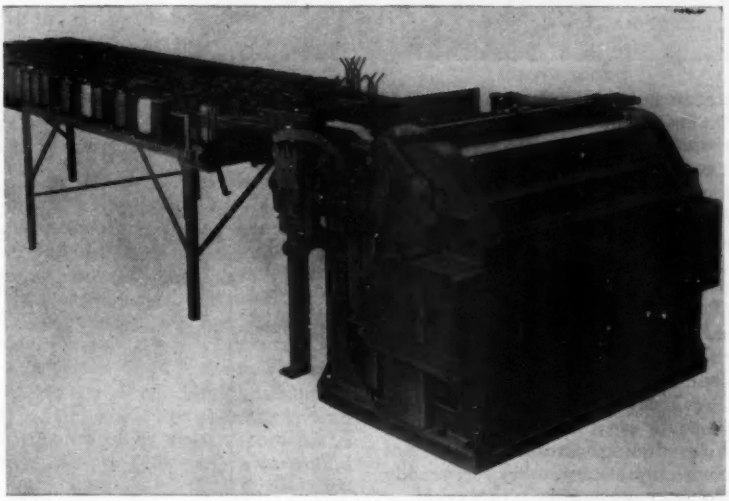
THE efficiency of the carpet weaving operation is largely dependent on correct preliminary spooling of the pile yarn, and the latest MAS.1 setting frame recently announced by Platt Bros. incorporates several important, patented developments designed to reduce the percentage of waste yarn which occurs during the manufacture of spool Axminster carpet. Mill tests have shown that this new setting frame does indeed lead to a satisfactory reduction in tuft yarn waste, resulting in less spool strippings, more carpet woven and less mending.

On the orthodox setting frame, the length of yarn wound on the spools varies considerably, and when several spools have run off in the loom the pile yarn left on the remaining spools in the set is waste. If a thread breaks during the winding of a spool and is not detected early enough to stop the frame before the end wraps round the spool, it is necessary to release the spool from the winding rollers and then pull off some yarn to find and piece the broken end. This invariably leads to a difference between the recorded measured length of yarn and the actual length wound.

On previous models, the length of yarn wound on to a spool is measured by the revolutions of one of the winding rollers. These rollers rotate at slightly different surface speeds to impose a drag on the yarn and so obtain a compact and tightly wound spool. It was possible, therefore, for either of the winding rollers to be controlling the yarn speed at any given moment, so that a slight slip might be occurring at the roller operating the measuring indicator.

To overcome this difficulty an independent measuring roller has been introduced. It is driven by the frictional contact of the yarn passing round its periphery. If the winding rollers are released from the spool to find and piece up a broken end, the independent measuring roller will not commence to turn and register additional length until the slack yarn made in finding the broken end has been rewound on to the spool.

Opening the winding rollers to release the spool so that broken ends can be pieced up is not conducive to even and compact winding, and a new



A satisfactory reduction in tuft yarn waste is achieved with the MAS 1 setting frame

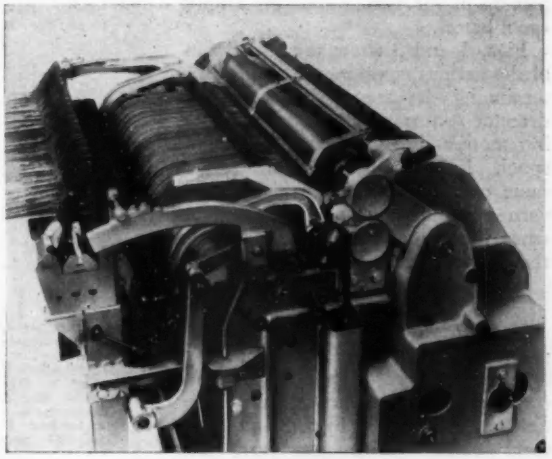


Fig. 1. Setting frame with components in working position

* *Platt's Bulletin, Vol. 9, No.* 10.

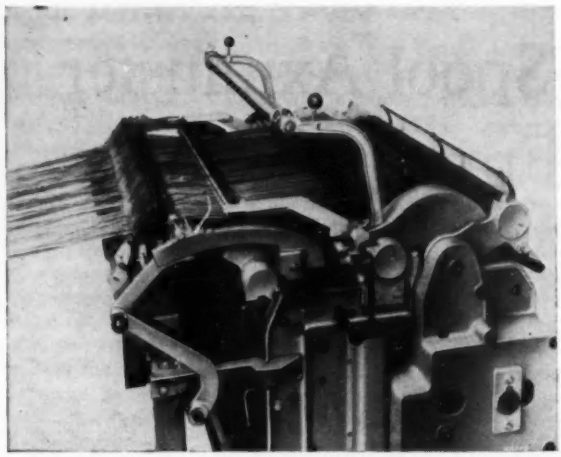


Fig. 2. Frame stopped for setting the coloured yarns

detector stop motion has been designed to prevent broken ends passing on to the spool. With this motion, each end of tuft yarn passes over a tumbler which operates to stop the frame if a yarn break occurs or a creel bobbin is exhausted.

A pneumatically controlled tension device is incorporated to provide sufficient yarn tension to operate the tumblers effectively and to release the tension when setting or changing the coloured yarn in the pattern.

Previously it was possible for some threads to cross on the spool barrel during winding. Crossed ends do not pass through the tuft tubes very readily and this causes trouble during weaving. The elimination of this fault is particularly desirable where one operative is looking after several looms. An auxiliary reed has been applied to extend the thread alignment control up to a point much closer to the winding rollers and thus prevent crossed ends. A novel method of handling and clamping the yarn has been introduced to facilitate colour changing and the placing of the yarn round the empty spool barrel.

Figs. 1 and 3 show the disposition of the various components of the yarn tensioning device on the creel, the detector stop motion and the measuring motion during the winding of a spool. Figs. 2 and 4 illustrate the same components, together with the yarn clamping and handling device, when the frame is stopped for setting the coloured yarns.

Yarn Tensioning Device

Yarn tensioning is provided by passing all the ends of yarn from one longitudinal row of bobbins in the creel between three vertical bars. The first and last bars B (Figs. 3 and 4) to make contact with the yarn are stationary, while the centre bar C is movable. On a 4/4 creel there are usually nine longitudinal rows of creel bobbins, each with its own set of drag bars.

During winding, the centre bar is displaced sideways relative to the fixed bars to provide tension on the yarn. When the pattern is being changed for the next spool or a broken end is being pieced, the centre bar is moved out of contact with the yarn to facilitate the handling of individual threads.

All the centre drag bars are secured to a horizontal member which is mounted on rollers and traversed by a double-acting, pneumatic cylinder fed by compressed air. The cylinder is controlled by midget valves operated by push buttons located on each side of the creel to enable either of the setters to regulate the motion at will.

Detector Stop Motion

The detector stop motion reed is built up with double dents instead of the usual single dents. Every alternate

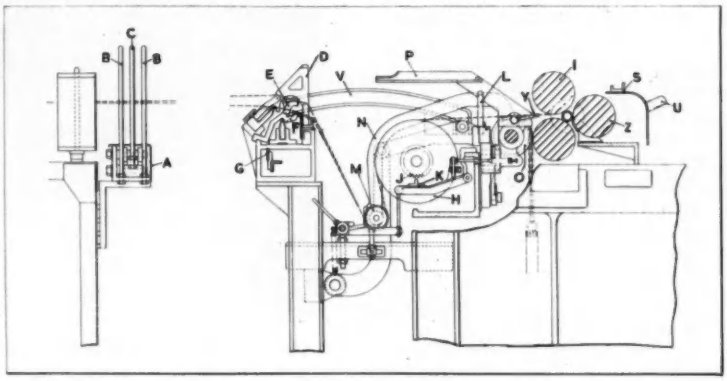


Fig. 3

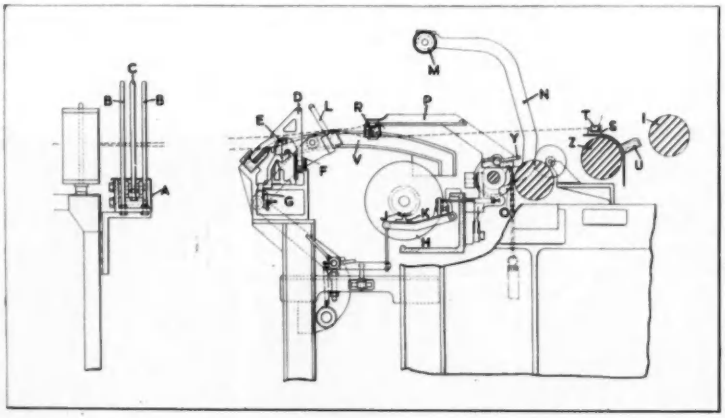


Fig. 4

KEY TO THE DIAGRAMS ABOVE

A—Yarn tension motion on creel. B—Stationary vertical tension bars. C—Movable vertical tension bars. D—Detector stop motion reed. E—Tumbler for top tier ends of yarn. F—Tumbler for lower tier ends of yarn. G—Electrically energised detector bar. H—Measuring roller. I—Top winding roller. J—Toothed wheel on pivot of measuring roller. K—Retaining catch for toothed wheel. L—Moving reed with slot for threading comb. M—Yarn guide roller. N—Swing levers carrying yarn guide roller. O—Counterbalancing spring-loaded drum for swing levers. P—Bracket supporting yarn carrier bar. R—Yarn carrier bar. S—Nest for yarn clamping bar. T—Yarn clamping bar. U—Spool rest. V—Curved guides for moving reed. Y—Auxiliary reed Z—Pressure winding roller.

thread occupies a high level position in the double dents, while the remaining threads pass through at a lower level.

In moving from the creel to the measuring roller and on to the spool, the threads are subjected to a tension sufficient to tilt tumblers E and F forward on their knife-edged fulcrum and bring their lower extremities out of contact with an electrically energised detector bar G. This position is maintained during winding. If a thread breaks or a supply bobbin runs out, the tension is released and the tumbler for that thread swings on its fulcrum and contacts the detector bar, thus automatically stopping the frame with the broken end in sight and in a position where it can be pieced up readily.

By operating the threads at two levels in the stop motion reed, the top surfaces of the tumblers can be made sufficiently wide to ensure that each thread remains in contact with and in full control of its own particular tumbler.

Measuring Motion

A simple and efficient measuring motion is applied. The length of yarn required on the spool is pre-set on the meter and a micro-switch automatically knocks-off the machine when this length has been wound. After the initial setting, it does not need any further attention until it is desired to alter the amount of yarn wound on the spools, when it is re-adjusted to the new value. This motion is equally accurate for over and under-wound spools.

The measuring roller H, which is driven by frictional contact of the yarn, is coupled directly to the measuring indicator. When setting a new spool, the yarn guide roller M is released from its retaining catches and raised out of contact with the yarn. On lifting the guide roller, spring action moves the retaining catch K into engagement with a tooth on the wheel J secured to the measuring roller shaft. This prevents any movement of the measuring roller H during the setting operation and ensures that the actual predetermined length will be wound on the spool. Before re-starting the frame, the guide roller M is lowered to its working position, where it depresses the catch K and holds it out of engagement with the wheel J.

Spool Setting

When a spool is filled, the setting procedure is (1) re-set the measuring indicator, (2) swing the auxiliary reed away from the winding rollers, (3) raise the moving reed to bring the threading comb into contact with the yarn, (4) release the guide roller, (5) open the winding rollers, and (6) roll up the spool and fit the cap on to the threading comb. There is then sufficient slack yarn available to allow the spool to be placed on the spool rest U without the necessity for dragging yarn from the creel bobbins.

A clamping bar T is inserted in the nest S to grip the yarn, the ends of yarn are severed and the full spool is removed. The moving reed L is next traversed by hand backwards along the curved guides V to a position adjacent to the detector stop motion, after which the yarn carrier bar R is positioned on brackets P and the tension released from the yarn on the creel so that individual threads are free to be moved.

A single thread is withdrawn from the clamping bar T and the two reeds L and D. The new colour is inserted simultaneously in both reeds and the free end of the thread placed on and retained by the yarn carrier bar R. This operation proceeds until all the necessary colour changes have been made.

Carrier bar R with the new colours attached is placed behind the clamping bar nest S, where the ends are severed to drop on to an empty spool barrel ready for making an over-wound spool. Clamping bar T is then removed to allow all the remaining ends to fall on to the empty spool. For an under-wound spool, a wire is inserted near the bottom winding roller and the ends are dropped on to the wire. An empty spool is placed over the ends and the wire is raised to flick the yarn round the spool barrel. The winding rollers are then closed on the spool.

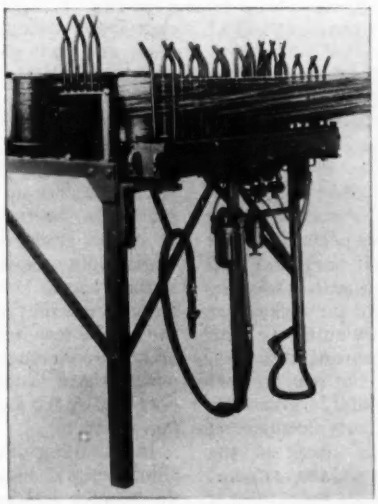


Fig. 5. Close-up view of pneumatic yarn tensioning motion

The moving reed L is swung forward and lowered into the winding position and the threading comb is inserted. Guide roller M is moved down to its operating position, thus automatically releasing the measuring roller catch K, and tension is applied to the yarn.

The cluth foot lever is depressed to commence winding and then the pivoted auxiliary reed Y is swung towards the winding rollers so that the control of yarn alignment is extended from the moving reed to a point very close to the winding rollers.

Conversions

A very important advantage of these new motions is that they can be fitted on previous model of setting frame to enhance quite considerably its operational efficiency.

Two types of modification can be carried out. A full conversion consists of applying:—

- Measuring motion complete with moving reed.
- Auxiliary reed for extending control of yarn alignment.
- Yarn handling and clamping device.
- Detector stop motion.
- Yarn tension motion on creel.

A partial conversion comprises:—

- Measuring motion complete with moving reed.
- Auxiliary reed for extending control of yarn alignment.
- Yarn handling and clamping device.

General

Each MAS.1 setting frame is a completely enclosed unit, thus providing efficient guarding and facilitating cleaning. The drive is by an individual electric motor housed inside the frame which is coupled up to a totally enclosed gearbox. All components in the gearbox work in an oil bath and apart from keeping the lubricant topped up it will run for considerable periods without attention. A primary chain drive between the motor and gearbox provides a ready means of altering the speed of the frame, should this be desired. Winding speeds of from 50 to 80 ft. per min. can be obtained. Movement of a handle changes the frame from over-wind to under-wind or conversely.

Winding is performed by three fluted rollers which revolve the spool by frictional contact with the yarn along the full length of the spool

(*continued on page* 345)

Cotton Ginning in Uganda and Tanganyika

This is the second half of a short survey made by Mr. L. H. C. Tippett (British Cotton Industry Research Association) on the ginning conditions in three African areas. The first part of the survey—dealing with the Sudan—appeared in "T.M.", August, page 297

The Uganda crop, BP52 mostly $1\frac{1}{8}$ - $1\frac{3}{16}$ in. staple and S47 mostly $1\frac{1}{16}$ - $1\frac{1}{8}$ in. staple, is raingrown and produced by peasant cultivators on small holdings. Consequently the cotton varies from lot to lot in quality according to variations in natural conditions; methods of farming such as dates of sowing, picking and weeding; insect attack; and the care with which the cotton is gathered and blemished lint and extraneous material are picked out—formerly there was trouble due to contamination with sisal fibre, but this has been almost eliminated. Jute fibre from bags and packing materials and also banana fibres sometimes occur in the lint, but vigorous action is being taken to reduce these to a low level also. Agricultural officers strive continuously to improve the standards of the cultivation and preparation for markets of the crop and their efforts slowly make progress. It is the job of the ginning industry to produce, from the cotton supplied by the cultivators, lint that is as clean and uniform in quality as possible.

Lint Marketing Board.—Most of the ginneries are operated by private firms—twelve out of 131 were run by Co-operative Unions of African cultivators in the 1958 - 59 season—but the whole industry is under close statutory control, jointly exercised by the Agricultural Department and the Lint Marketing Board. Only ginneries licensed by the Director of Agriculture are allowed to operate and a licence is given only, if, among other things, the buildings and equipment conform to certain conditions calculated to provide a satisfactory working environment and to facilitate the production of clean lint. Whilst the specifications for ginneries and their buildings were legally enacted in 1952, they were not fully implemented until the 1956 - 57 season. Since that time there has been further substantial improvement. Each ginnery is allowed to collect cotton only from a defined area, although there is some looseness in the working of this condition, and towards the end of a season seed cotton may be moved from a ginnery that has processed its quota under a pooling scheme to one that is short.

The Lint Marketing Board influences the working of the ginneries mostly through its team of four inspectors. These have powers to enter and inspect, and if they find that ginning is being carried out in a manner that is damaging to the lint they may close the ginnery until the defects are rectified, provided they obtain the necessary authority from the Director of Agriculture, who is the licensing authority. Such temporary closures are a last resort, but may amount to fifteen to twenty-five a year in a total of 131 ginneries. Ginning inspectors visit each ginnery fairly frequently; they check the setting and condition of much of the machinery, examine the quality of the lint and the standard of "housekeeping"; they constantly urge the management and staff to make improvements and give close guidance on how to do this. Before the ginning season, meetings are held with managers and fitters, at which technical information and advice are given. By their enthusiastic work in these directions the inspectors have done much to improve ginning in Uganda during the past few years.

Another pressure on ginners which encourages good work is the incentive scheme run by the Lint Marketing Board. A sample of cotton from each lot of fifty bales is assessed by the classers at the Lint Marketing Board for grade (largely cleanliness) and ginning quality. The ginning quality depends on freedom from the following defects: stripper damage to the fibre, whole seed, crushed seed, broken seed and extraneous matter such as leaf and trash, and stained lint; it also depends on the "preparation" or smoothness of the sample. A numerical score or "coefficient" is given to the sample on the basis of these assessments and the scores are averaged over the season for each ginnery. At the end of the season the ginnery receives a substantial extra payment if its score is high, and pays a penalty for a low score. These payments and penalties are large enough to provide a real incentive to ginners to produce good lint. The scores are also known to the ginning inspectors; they show where attention is needed and form part of the reputation of the ginnery.

Quality Aims.—The ginner's first duty is to purchase as cotton of "fair average quality" only satisfactory seed cotton. The cultivator is usually required to "pick over" any lot of cotton which does not conform to the official standard and remove defective material. At the beginning of each season the Agricultural Department is statutorily required to set a grade standard for good raw cotton in each zone and any ginner whose purchases fall below such standard is liable to prosecution. All cotton accepted as attaining or exceeding this standard is paid for at the same price. Inferior cotton is relegated to a lower grade and is bought at the end of the season at a lower price.

In theory this procedure should ensure that only cotton which matches up to the official standard is bought as first grade. In practice a ginner can, and does, reject offerings of mixed grade cotton if they are occasional; but in a climatically unfavourable year, when the proportion of stained cotton is high or the bulk is dull in colour, the ginner's position is difficult and some are induced to avoid the public resentment that would be caused by insistence on strict adherence to the standard. In such circumstances neither legal sanctions nor the quality incentive scheme operated by the Board can be entirely effective in maintaining grade.

In handling the cotton the ginner has the duty of eliminating as much extraneous material as possible, and the benefits under the incentive scheme are such that most ginners are willing to pay to have the seed cotton examined at one or more places in its progress. He must also prevent

tly, oily waste and other extraneous matter from getting into the lint, and this involves keeping the machines and their surroundings clean. The ginning inspectors are constantly keeping up the pressure to ensure this.

Damage.—In order to prevent damage to the lint and seed, the gins must be kept in good mechanical condition and adjustment. This is the duty of the gin fitters, who work with varying degrees of competence, and the inspectors always pay close attention to this on their visits. The most ready evidence of anything going wrong or out of adjustment is the appearance of the lint as it comes from the gin roller.

Of the 131 ginneries in Uganda, most have twenty single-roller or ten double-roller gins. Each ginnery has an opener for the seed cotton. Mostly the equipment is old-fashioned and orthodox, even when it is recent in date, and the seed cotton and lint are largely transported manually. Here and there, however, there are a few developments.

Developments.—In one of the ginneries visited there is pneumatic transport of cotton from the store to the opener, and in another there is pneumatic collection and transport of lint to the baling press, which is filled by hand. In one ginnery seed cotton from the opener is passed between two rows of gins by a long moving lattice, whence it is taken for feeding the gins. This not only saves labour, but provides a good opportunity for finding and removing extraneous material. The idea would be worth developing and its application extending. A few ginneries have automatic feeds, but they were not always satisfactory in operation, and sometimes they needed a periodical interruption to the feed. Political uncertainties inhibit ginners, most of whom are Asians, from investing in new equipment, and it seems likely that for some time to come the emphasis will be rather on using existing equipment to greater advantage than on following new developments.

Tanganyika

Until recently the cotton crop of Tanganyika, mostly of staples of $1\frac{1}{32}$ in. to $1\frac{3}{32}$ in., was marketed by the Lint Marketing Board of Uganda, and arrangements for controlling the buying from the growers and the ginning were similar. In and since the year ending June 30, 1959, the crop has been handled by the Lint and Seed Marketing Board, Tanganyika, which has its own staff of classers and ginnery inspectors, and divergences in the practices of the two countries are beginning to appear. One divergence is the method of buying. Co-operative societies of growers have been developed, and in the Lake Province, which produces about 90% of the crop, these have a monopoly of the buying of seed cotton. The ginners, most of whom are Asians owning private concerns, are therefore not responsible for the grade, and the incentive scheme is simpler than that for Uganda by the exclusion of this element.

Another divergence is due to the rapid and continuing increase in the Tanganyika crop. It has risen from about 30,000 bales in 1947 to about 200,000 bales in 1959, and further large increases are expected, mostly in Lake Province. A consequence is that new ginneries are needed, and four American-type ginneries, with Mitchell precleaners and 60-in. Murray roller gins are being erected. These are owned by the Victoria Federation of Co-operative Unions. This is an extreme example of a tendency to technical change that is evident. The ginneries are somewhat larger than those in Uganda, the typical one containing twenty-five double-roller gins and producing 500 - 600 bales a week. The general quality of ginning owes much to the influence of ginning inspectors, as in Uganda, and probably the most important element in this quality is the exclusion of extraneous material.

New Setting Frame

(*continued from page* 343)

barrel. Fig. 6 illustrates the disposition of these rollers in relation to the spool and the yarn. The relationship between the path of the yarn and its surface contact with the winding rollers is the same for both over-wound and under-wound spools.

The facility for changing easily and rapidly from over- to under-wind and conversely is a great advantage when the design in one half of the carpet width is the reverse or mirror image of that of the other half and where two or more spools are required for each row of tufts. Instead of winding one spool and then having to re-thread all the ends from the creel to the setting frame in the reverse order for the second spool in the row, it is only necessary to fill the first spool over-wind and switch the frame to under-wind for the second spool, without altering the position of a single end of yarn.

The pressure roller Z is mounted so that as the spool builds up in diameter it moves on a substantially horizontal plane. Pressure exerted by this roller is applied through weights which can be regulated as desired.

When the spool is full, the pressure roller Z is moved clear of the spool and the top winding roller I is swung out of its working position, as illustrated in Fig. 4. After the full spool has been replaced by an empty one, roller I is swung back into the winding position and roller Z moves and makes contact with the yarn on the new spool, as shown in Fig. 3.

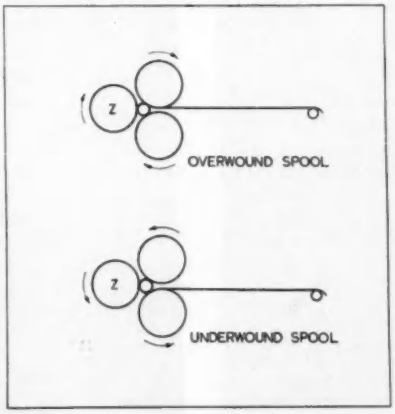


Fig. 6. Yarn path for over-wound and under-wound spools.

Both these rollers are operated automatically by cams. Pressure on a foot pedal engages a clutch in the drive which performs this movement. The clutch is automatically disengaged when the rollers reach the fully open position. A second operation of the foot pedal closes the rollers. Opening and closing can be carried out at any stage of the winding process and the automatic action relieves the operative of a laborious duty.

The fluted winding rollers, which are mounted in ball bearings and positively driven by bush roller chains, are constructed so that they can be adapted for winding all spool width up to 36 ins. between flanges and up to $3\frac{1}{4}$ ins. diameter. The changeover to a different width is simply and rapidly performed without removing the rollers from the frame. Setting frames suitable for winding spools 45 ins. and 54 ins. wide are also available.

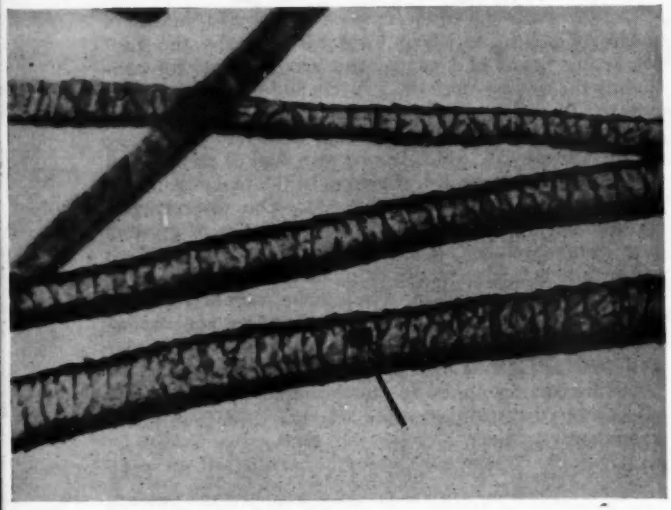


Fig. 1. Wool hairs as seen under the optical microscope at 500 diameters

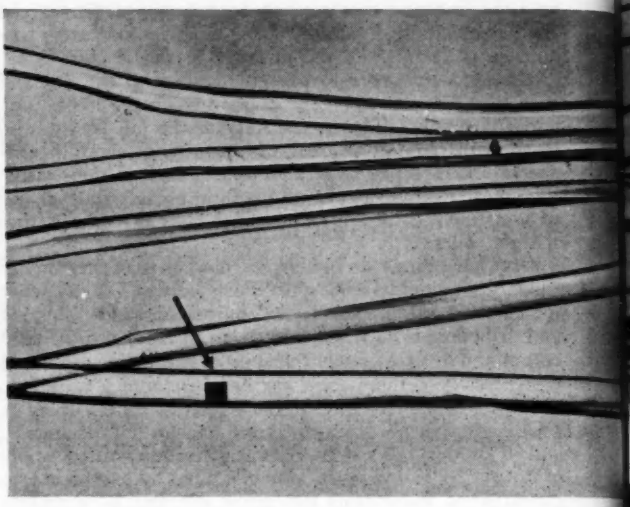


Fig. 3. Natural silk fibres under the optical microscope at 400 diame

Fibre Microscopy—II

SPECIALLY CONTRIBUTED

FOLLOWING upon the various photographs of the cotton fibre ("T.M.," July, page 283), it is interesting to see the appearance of some other fibres. Fig. 1 shows several wool hairs as seen under the conventional optical microscope and reproduced with an enlargement of 500 diameters; a small portion of the lowest fibre is indicated by an arrow and it is this area which is reproduced in Fig. 2 with an enlargement of 12,000 diameters under the electron microscope. The wool hair in Fig. 2 still contains the natural grease; it is a remarkable picture of the corner of a single scale and shows the overlapping arrangement in detail of the system of scales from Fig. 1.

Fig. 3 is the well-known picture of natural silk fibres taken under the optical microscope and reproduced with

(*continued on page* 348)

Fig. 2. Portion of a wool hair seen by electron microscopy at 12,000 diameters

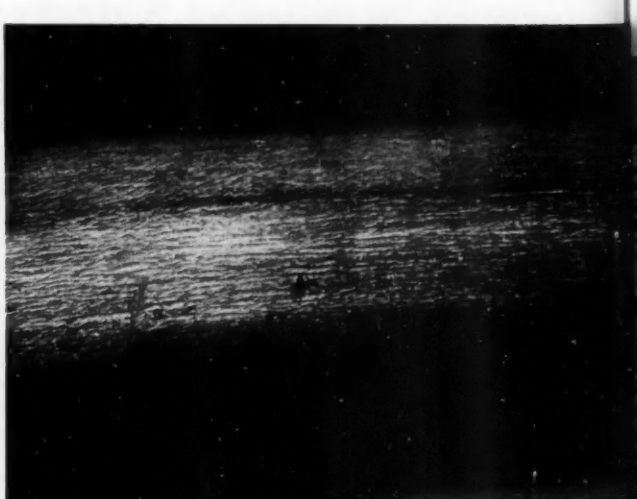


Fig. 4. Portion of a silk fibre at 7,000 diameters as shown by the electron microscope

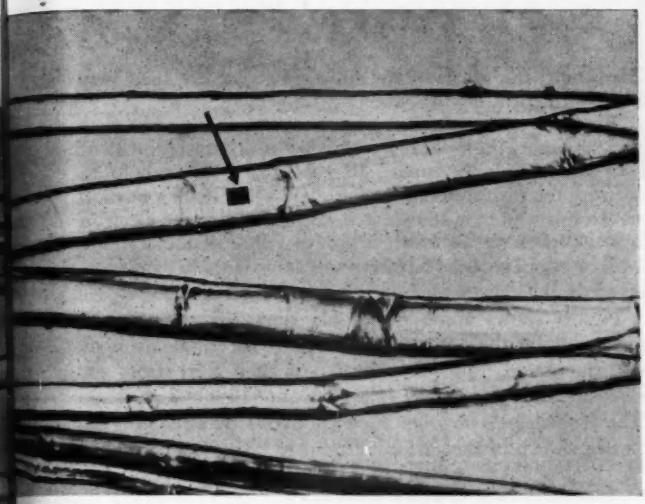


Fig. 5. Flax fibres as shown by the optical microscope at 500 diameters

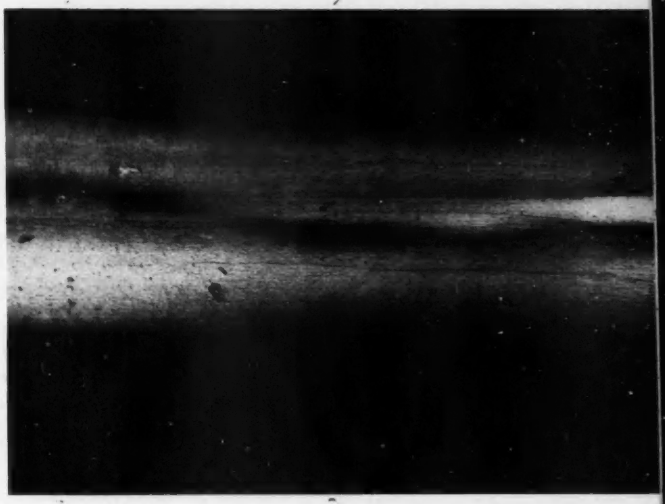


Fig. 8. Part of a viscose rayon fibre at 7,000 diameters as shown by the electron microscope

Fig. 6. Electron micrograph of part of the flax fibre at 12,000 diameters

Fig. 7. Fibres of viscose rayon at 500 diameters as shown by the optical microscope

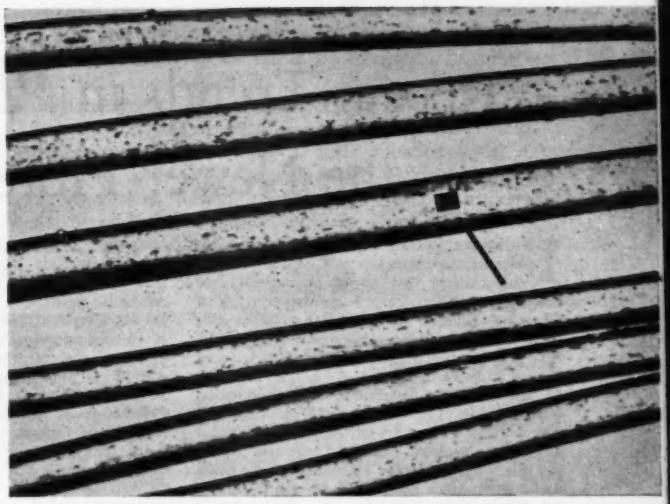
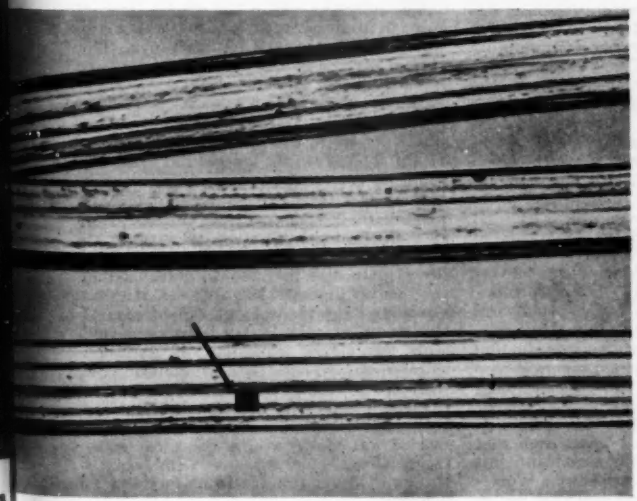


Fig. 9. Polyamide fibres as shown at 400 diameters by the optical microscope

Fig. 10. Electron micrograph of part of a polyamide fibre at 12,000 diameters



Fibre Microscopy

(*continued from page* 346)

an enlargement of 400 diameters. Once more the denoted area has been reproduced as shown under the electron microscope with an enlargement of 7,000 diameters. It will be noted that the grooves of the surface of the fibre are highly parallel, thus indicating a remarkable degree of orientation of the fibre silk fibroin on the outside of the fibre.

Fig. 5 is a photo-micrograph of the flax fibre, after scouring and bleaching; the magnification is 500 diameters. The characteristic nodes or cross-like dislocations are quite clear and resemble the stem of bamboo, as often remarked. Fig. 6 is a portion of the bleached flax fibre, from an electron micrograph with an enlargement of 12,000 diameters; the fibrils of the fibre substance are seen very clearly in their highly parallel arrangement.

Fig. 7 is a reproduction of viscose rayon fibres as they appear under the optical microscope at an enlargement of 500 diameters; the typical longitudinal grooves help to identify the conventional textile rayon. In Fig. 8, a portion of the rayon fibre is shown as it appears under the electron microscope with an enlargement of 7,000 diameters; the surface appears moderately smooth with a uniform structure lacking in definite characteristics.

Fig. 9 shows some polyamide fibres as they would appear under the optical microscope at an enlargement of 400 diameters. Fig. 10 shows part of a fibre from an electron micrograph at an enlargement of 12,000 diameters. The high degree of orientation produced by stretching is clearly shown in the surface structure.

Textile Institute

Recent Trends in Printing the Newer Fibres

IF designers could only be persuaded to consult printers, not only about colouration but about suitable fabric selection to enable the requisite colours of adequate fashion to be obtained, it would simplify life considerable, said Mr. E. E. Bowker (Industrial Dyestuffs Ltd.), in a recent address to Leek and District Section of the Textile Institute. He instanced fabric made from a blend of acrylics and viscose. It was an excellent fabric but the designers wanted bright colours comparable with acid dyes on wool and the only suitable range of dyes available for printing this fabric was the vats. This was a case where the printer could have told the designer that if he wanted full brilliant shades on his fabric he should give the printer a 100% acrylic to print with basic type colours and then he could have any shade he liked.

Mr. Bowker said, apropos of cellulose acetate, that there had been increased interest in the use of basic type colours (e.g. Astrazones) on cellulose acetate to produce very brilliant and stimulating shades. Concurrently with the renewed interest of basic, had come an interest in acid colours because of the excellent wet fastness properties and their absolute fastness to sublimation. The increasing use of vat dyestuffs, too, should be noted. The introduction in recent years of new reducing agents had opened the field very considerably and Rongalite M and Brotosul were later entrants in a sphere which had been pioneered by Hardman and Holden with Manofast.

The acrylic fibres, for the purpose of the lecture, were sub-divided into the pure polymers such as "Orlon 81," "Redon," etc., and the more readily dyed products such as "Orlon 42," "Acrilan," "Dralon," "Courtelle," etc. The latter group would be considered to represent the usual acrylic the printer would encounter, but there was considerable variation in the "printability" of the various members of these sub-groups but, generally speaking, these fibres could be printed with: (*a*) dispersed dyes, (*b*) vat dyes, (*c*) basic dyes.

The most popular process was the use of certain selected basic colours such as the Astrazons, Basacryls, Maxilon Diolene and Sevron ranges. These, said Mr. Bowker, gave fastness properties far in excess of traditional "basic fastness." At present there was no suitable black in the basic range but this was a gap readily filled by the dispersed type blacks which worked well alongside the Astrazones.

The printing of polyester fibre was, in the main, achieved by the use of dispersed dyestuffs and the yield was dependent on the method of fixation. It was not necessary to use carriers where pressure steaming was possible. A much used process of fixation was by the use of dry heat at a temperature of approximately 200°C.

There was considerable interest in the use of vat dyes on polyester fibre. One method was to use Manofast as the reducing agent and steam with slight overpressure but there were some difficulties in the satisfactory re-oxidation of the colour. Another method was to fix the unreduced vat pigment by a thermal treatment. Specially prepared forms of suitably selected vats had been marketed by Cassella under the designation "Polyestron Printing Colours." Surplus colour was removed by a "reduction clear" and very satisfactory results were obtainable.

Flock printing, due to the introduction of new electrostatic flocking units, was now firmly established. In the adhesive field two main types were available—(*a*) solvent based, (*b*) water based. The main advantage of solvent-based types was that they required no baking treatment but were cured at room temperature. Water-based types were in many cases similar to those used in pigment printing but were generally quicker drying.

With glass fabrics, there was an increasing interest in the normal household and consequently fastness to light washing was required. Over the past few years, there had been a demand for vat dyes on polyamide fibres. Here they came against one of the fundamental problems of the poor light fastness of many vats on nylon. Work had shown that the dyes of the largest molecular size had the poorest affinity and that dyes of easy reduction characteristics were the most readily destroyed by light.

The fastest to light were the violets, blue greens and brown brands whilst the poorest fastness was in the bright yellow and orange brands. Fixation was possible by the Rongalite-potash process but mainly the use of "Manofast" or similar products were favoured because of the better yields and also the lack of "halo" problems. The re-oxidation of the print was a major problem and hydrogen peroxide was for many dyestuffs, insufficient. Sodium nitrate and sulphuric acid often gave the best results and stress was laid on a really thorough soaping to ensure complete re-oxidation.

Probably the group of colours gaining most in importance for printing polyamide fibres was the pigment dyestuff range. The major advantage was the lack of a wet after-treatment and the consequent avoidance of crease marks often associated with prolonged after-treatment on winches. For discharge styles there was still a shortage of suitable dyestuffs for ground with the requisite light and wet fastness properties.

A comparatively new development in print paste thickenings was the emulsion type thickenings. The use of water-in-oil and oil-in-water emulsions as thickenings for print pastes had rapidly advanced in the field of pigment printing and, without doubt, a large measure of the success of this group of colours had been associated with the clever utilisation of emulsion thickenings. There was a considerable interest in the extension of emulsion thickenings to other classes of colour and considerable experimental work was being carried out to determine the most satisfactory emulsifier for use with various classes of colours and various methods of printing.

The Ball and Bank Feed

The ball and bank feed has many good points. It is claimed that no other intermediate feed provides so ready an opportunity for correcting "off-shade" batches during carding

By J. A. B. MITCHELL*

(*continued from "T.M.," April, page 135*)

THE high degree of mixing power attained by the ball and bank feed can be demonstrated in a simple manner. Assume for this purpose that while carding a light grey batch an excess of black wool enters the scribbler via the feed board at the point marked "a" in Fig. 6. This would appear for a short time as a narrow band, predominantly black, over workers, strippers, swift and doffer but always in a straight line from the place of entry. When combed from the delivery doffer and caught up in the stream of fibres moving towards the twister funnel the narrow dark band of fibres would roll round the surface of the rope to become spread in a spirally disposed strip occupying a position near the perimeter as illustrated by the cross-sections shown in the diagram.

Should the lump of black be sufficient in amount to continue for say, 6 revs. of the doffer, then 45 ft. or so of rope would have an annular layer showing excess black surrounding a deep core of grey ground, followed by several feet of rope having a diminishing amount of black as the surplus fades out to give place to the normal grey of the batch. The same method of amalgamating local excesses of any component (colour or kind of fibre) in the side-drawn rope is unique and most propitious and is used in conjunction with another feature of the feed in bringing colour mixtures to shade during carding.

This is the second of the two striking and valuable features of the ball and bank feed—mentioned in the first article—when used in a three-part set. This has been extensively and advantageously employed in matching and shading colour mixture yarns which are traditional in the high-class woollen tweeds of the Scottish industry. No other intermediate feed provides so ready an opportunity for correcting "off-shade" batches during the actual carding process. Without this facility the blended stock would need to be "spot-on" shade before reaching the carding department, or else be returned to the teasing room for the addition of an appropriate amount of the correcting colour or colours by means of a further run through the teaser or at best by more bin blending.

To function in the proper manner so as to yield its best in mixing and levelling power the bank feed must serve the intermediate in a three-part set. Obviously it has little opportunity for so doing and no virtue as a feed in a two-machine set and is never used in such circumstances between scribbler and carder parts even with three or four swifts before and two after it. Where a colour mixture batch is found to be slightly off shade on coming from the scribbler, one or more balls of the required colour or colours can be introduced at the intermediate bank in place of the corresponding number carrying the ground mixture.

For example if a light grey batch is found to be too white then one or two balls of black (or even dark grey if more convenient) can be run in with 58 or 59 balls of the grey ground as shown in plates VI and VII. In subsequent side-drawing as a Scotch feed sliver band the interrupted patches of black (or dark grey) will be well intermingled with the stock grey by the lateral spreading and overlapping of the sliver folds on the feed sheet of the double-cylinder carder which follows. Should a bank feed again connect intermediate and carder parts these isolated dark ends entering and leaving the intermediate will be even more closely mixed in with the ground stock during side-drawing as a twisted continuous rope of fibres.

As already demonstrated, the two/two dark correcting ends will, at different points across the 60 in. width of web, coil around the mass of ground fibres to form two very thin annular layers in the cross-section throughout the entire length of each ball rope made by the intermediate for passing on. Later 60 of these corrected grey ends enter the finisher card side by side in the manner already describeds The slow continuous breakdown of each one of the many contiguous rope.

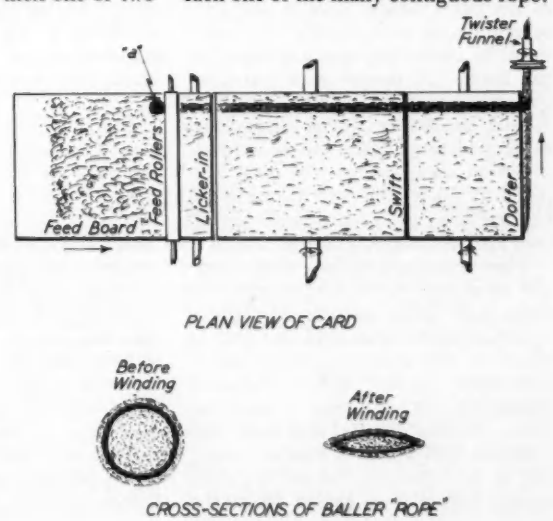
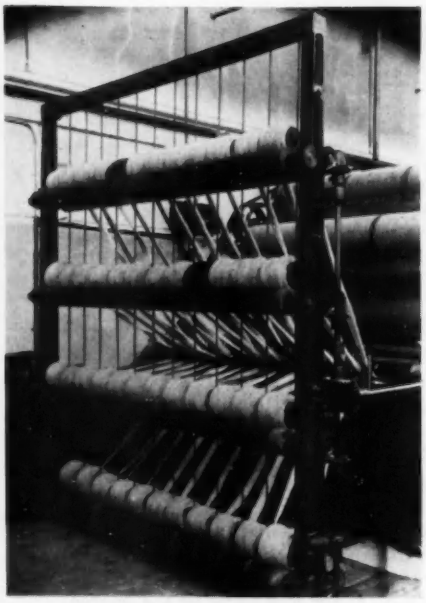


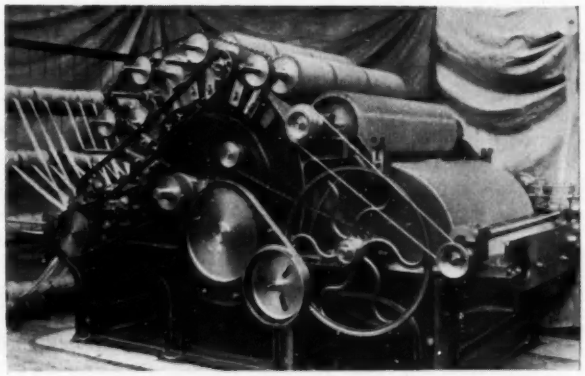
Fig. 6. Sketch demonstrating the high degree of mixing power attained by the ball and bank feed

* *Scottish Woollen Technical College, Galashiels.*



(left) Plate VII. Intermediate bank showing two balls of black to correct an off-shade light grey batch

(right) Plate VIII. View of intermediate card showing the two bands of black passing through the grey ground



ensures, by the time four workers intervene to add to the mixing, that black and white fibres are well blended before the web is split up into ribbons by the rings of the condenser doffer.

Admittedly this method of correcting a mixture batch which is not up to shade takes time, particularly if wool of the required hue and quality is not in stock, because with such a contingency an ample amount of white material for this purpose has to be sent to the dyehouse. Even when given priority in dyeing this small lot has to be dried off, willeyed and scribbled in the form of several balls before being in a presentable state for use on the card set. The intermediate and carder parts usually have to stand for several hours, sometimes a whole day, until the correcting colour is ready for the bank. Of course in a "straight-through" set the same time would be wasted in dyeing a few pounds of shading material unless excess of some, if not all components, had been prepared by the dyeing department in the first instance, and a few pounds of each held back when batching and blending.

This procedure which wastes time and consumes material in an effort to make bulk lots conform to sample seems anachronistic and is out of place in the modern conception of high-level output and streamlined processing for economic conversion costs. Without the ball and bank feed. it means that a colour mixture batch has to be "dead-on" shade with the sample before it is passed on to the carding department. But when facilities are readily and always available within the set, there is the temptation to leave the final touching-up of shade to be done during passage through the cards after testing the carded web coming off the intermediate.

Maintaining Shade Standard

It was customary at one time in some of the larger yarn making plants of the Scottish woollen industry to carry a stock of colours in ball form. These were invariably the left-overs from previous batches or unused balls of carded material prepared as surplus to requirements from hastily dyed lots needed for earlier batches on the cards. In a trade where cloths at one time featured the mixture yarn in Cheviot and Saxony qualities it was inevitable that some correcting colours in ball form would outlast the batch for which they were made. These were often kept intact for later use in the same way rather than be cut up and returned as soft waste from the department. In all such contingencies it is more sensible to weigh out and dye a little extra to the net amount deemed necessary to shade-up the mixture to standard and at the same time ensure enough on balls to outlast the batch on the cards.

Much of the time wasted and the loss of output incurred by stoppage of the card set concerned, was and still may be, due to the need for repeated efforts, using small-scale trials, to match the bulk to the standard. This involves weighing out components (ground and correcting colour or colours) scribbling, washing and felting the carded mixture, but if the standard is a swatch of yarn the trial lot must be converted into a few yards of thread of the same size and direction of twist. Unless the shader is experienced, skilful and acute in colour perception this can be a tricky business before and after the batch has started on the cards. These "adds" increase the weight of the batch and now more than ever before, should be used only as a last resort.

At one time in the Scotch tweed trade the majority of the three-part sets had ball and bank feed also serving a single-cylinder carder followed by ring-doffer condenser, either the single doffer for fine Cheviot and Saxony yarns so common at one time, only occasionally the double doffer type for the medium and heavy counts made from coarse Cheviot and homespun blends. In this case each ring on the condenser doffer is served by the sliver rope from a ball facing it on the other side of the swift. Thus a 60-end bank will provide the same number of slubbings, say two bobbins of 30 each, on the condenser front. Hence, other things being equal, all carded slubbings delivered are spinnable with no need to discard the two outside ones as waste as customary when any other form of feed serves the finisher card.

The baller ropes produced by the intermediate, each one the aggregate of 60 fed to it, invariably reach a high level of regularity (see Fig. 5) in weight per unit length over the 100 yds. or so carried on each ball, and at the same time vary little one to another from the mean of 60 turned off one at a time to fill the second bank. In the case of the bank feed to the carder part a supplementary heck of special design is located close in to the feed rollers. The slits or divisions of this heck are of normal depth, but are only about $\frac{3}{16}$ in. wide so that each ball rope must pass through the space obliquely if not on edge.

This additional heck is marked by arrow on Plate IX which illustrates the bank serving the last machine. The pitch of the slits or divisions in this heck must coincide with the pitch of the rings on the condenser doffer. An

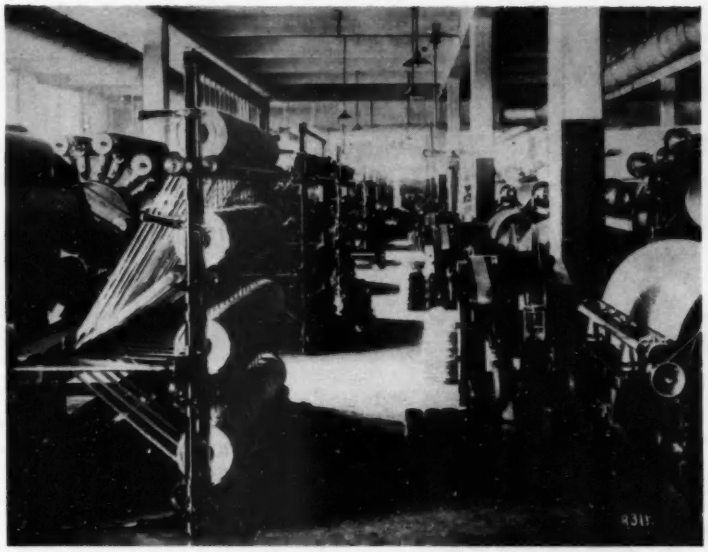


Plate IX. Ball and bank feed between intermediate and carder sections; arrow points to the special heck (courtesy, Platt Bros. (Sales) Ltd., Oldham)

equally important requirement is that the heck must be set in true alignment with the ring doffer (or doffers) so that the slit is directly opposite the centre of the corresponding ring on the front. Such a permanent setting ensures that each sliver rope is directed on to a path over licker-in and swift to contact a ring.

Such an "in-line" approach to the rings of the doffer is preserved at all times only in the absence of a "tummer," "breast" or second swift and is made more effective if there is no side play in the rollers in their bearings and obviously in the absence of any traverse motion on a worker. In the case of firmly twisted, compact, baller slivers for fine count Saxony yarns the 60 entering the feed rollers never merge in passing through the machine with the result that narrow peripheral belts of card teeth on swift, workers, etc., are almost devoid of fibres. Consequently the space bands between neighbouring rings of the single doffer condenser have their function reduced to a mere safeguard, so that separation of contiguous ribbons of fibres at the divider roller is made much easier and more complete.

Uniformity

In bulkier crossbred qualities for thicker counts the individual streams of material are not so obvious, though when combined with an "end-on" entry of fibres to the card the division into clear-cut slubbings at the rubbers is never so difficult as with other types of server mechanism. Under the best conditions the resultant slubbings show remarkably high degree of uniformity in count across the condenser, unless some abnormally high initial variation at the hopper gets through to show in some measure in the balls at the second bank, or where any difference in sharpness, height or tension of the teeth of a ring interferes with the chances of securing near-perfect results in the series of slubbings produced.

Normally the high level of regularity is assisted by the fact of using a single-cylinder carder and thus only one fancy, as it has been the contention based on observation and experience, that the duplication of these rollers on a carder part served by any other feed tends to aggravate the problem of light side ends on the condenser spool. In any case should certain individual slubbings in the series across the condenser be either light or heavy then a simple corrective can be applied by making a special ball for the final bank, viz., a thicker rope to counterbalance a thin end from the corresponding ring and conversely a thinner rope for serving one known to produce a heavy slubbing.

It is well known to users of a ring-doffer condenser that the occurrence of isolated ends which are either above or below the average count is often a permanent feature of the condenser until doffer rings are renewed so that the cure outlined above merely becomes a routine matter on each batch. In the obsolete style of bank used in former days the cure for permanently thick or thin ends on the spool was a matter of juggling with the tension of the appropriate ball sliver as it passed from the final bank to the carder part. A slubbing end, known to be heavy, was counterbalanced by increasing the tension during unwinding of that particular ball rope simply by reducing the diameter of the bank roller at the part on which the ball rested. Conversely, by nailing a thin strip of leather around the roller supporting a ball tended to ease off the tension during delivery and thereby counteract a thin end on the bobbin.

No other intermediate feed can offer a means of correcting variation in weight of individual slubbings, though of course the cure is rather crude and scarcely commendable in the modern technique of carding, but the older generation of craftsmen employed these simple and highly flexible expedients to reach high standards of yarn regularity, confident in the knowledge that they knew how to cure the fault without worrying unduly about the precise cause of it.

Production of Man-Made Fibres

Production of man-made fibres, though running slightly below the best levels of recent months, was a record for the month of June, according to figures issued by the British Man-Made Fibres Federation. There would appear to be a tendency at this time of the year to adjust production to the reduced offtake of filament yarns and staples resulting from the extensive mill holidays in both the weaving and knitting areas. Total output at 48·33 mn. lbs., compared with 51·99 mn. lbs. in May and 41·54 mn. lbs. in June last year. Of this, continuous filament yarn amounted to 21·87 mn. lbs., compared with 23·54 mn. lbs. in May and 18·87 mn. lbs. in June last year, and staple, at 26·46 mn. lbs., compared with 28·45 mn. lbs. in May and 22·67 mn. lbs. in June last year. Thus in the first six months of the year, total production reached the impressive figure of 305·33 mn. lbs., compared with 273·50 mn. lbs. in the previous six months and 240·39 mn. lbs. in the first six months of 1959, while in the first six months of 1958, the total was only 218·52 mn. lbs. Apart from the influence of mill holidays, mentioned above, demand for man-made fibres remains at a very satisfactory level, and the take up of continuous filament yarn for industrial purposes, mainly tyre-cord, is particularly encouraging. Spinners in both Lancashire and Yorkshire are still providing sustained business in all the regular types of staple, with rayon accounting for a high percentage of the total.

Million lb.

		C.F. (Singles)	Staple	Total
1959	(quarterly average)	58·71	69·77	128·48
1960	April ..	21·24	28·05	49·29
	May ..	23·54	28·45	51·99
	June ..	21·87	26·46	48·33

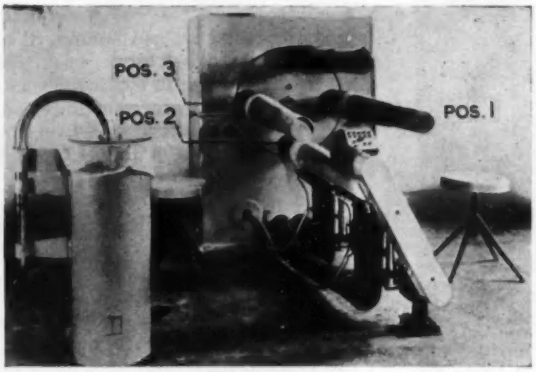


Fig. 1. "Selecto-Finisher," "A" and "C" units

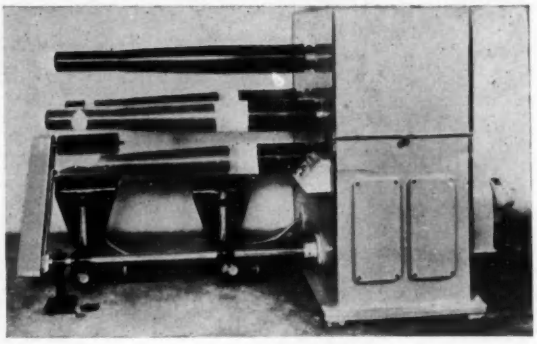


Fig. 2. "A" unit

The Selecto-Finisher

IN the manufacture of nylon stockings the greige hand finishing operation absorbs considerable amounts of labour, valuable factory space, and causes a high proportion of snags, etc., due to handling. The "Selecto-Finisher" (patents pending) recently developed and manufactured by Meccanica Del Nord, Milan, Italy, and distributed by Coates Smith Ltd., Canal Street, Nottingham, throughout the United Kingdom, British Commonwealth and Western Europe, excluding Italy, is designed to overcome these problems efficiently.

This machine, it is stated, can trim, inspect and select up to one stocking every five seconds, i.e. 1,350 dozen pairs every 45 hours. The machine can, in fact, work at lightning speed. For practical purposes, however, the normal output is approx. 200 dozen pairs per day or 1,000 dozen pairs per 45-hour week. In effect this machine, which is operated by two girls, makes possible a labour saving of approximately three girls per week.

Inspection tables, scissors or trimmers, and tables or shelves for collecting stockings are not needed. Handling is reduced; in fact, the stockings are handled once only from seaming or linking to pre-boarding. The stockings are trimmed, inspected, automatically reversed from inside out, sorted and transported to the pre-boarding room which can be up to 60 ft. away. This means a reduction in factory space requirements for the greige hand finishing operations.

These remarkable benefits are not obtained at the expense of quality and, it is claimed, that trimming is so effective that ends can be automatically cut to $\frac{1}{16}$ in. Inspection is extremely effective as the stocking is stretched on the form whilst inspection is being carried out, and because of the reduced handling, snags are reduced by 60%.

The machine consists of an "A" unit and either a "B" or "C" unit. The "A" unit is operated by an unskilled girl who puts the stockings in the greige over the black ebonite form which slightly stretches the fabric (pos. 1, Fig. 1). The machine is started by an operating switch and the form with the greige stockings turns 90° thus presenting the next empty form for positioning the stocking. The form holding the first stocking is then in position for automatic trimming (pos. 2, Fig. 1). A revolving brush untangles the foot and heel threads, and suction pulls down these threads, along with the welt threads. At the same time the form and stockings are revolving, bringing the threads into contact with a chrome nickel resistance wire, heated to 300°C. The air ducts providing the suction and the resistance wire can be brought close to the stocking, thus separating the ends as close as $\frac{1}{16}$ in. from the stocking. The ends are then blown into a bag on "A" unit. After this the machine automatically moves the form through a further 90° where the inspector can examine the stocking for faults (pos. 3, Fig. 1). To facilitate this the form is revolved by hand.

After inspection the stocking is sucked through the form and delivered either to the "B" or "C" unit. Naturally, the stocking is reversed as it is drawn through the suction tube. If the "B" unit is used the inspector, after examining the stocking, presses the appropriate pedal and the stocking is drawn away and discharged on to the appropriate tray of the "B" unit. The "B" unit is designed to lay the stockings flat, on black perspex trays, and individual counters signal the completion of each one dozen stockings. Trays can be supplied for perfects, seconds, sub-standards, etc. If the "C" unit is used the perfects are removed by suction and bagged in three, four or five dozen pairs.

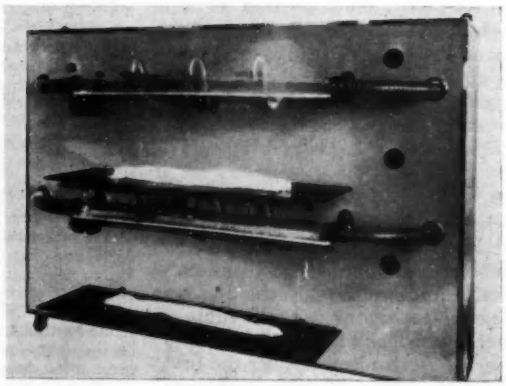


Fig. 3. "B" unit

Advantages claimed for the "Selecto-Finisher" include (a) low labour and capital cost (b) reduced overheads and factory space and (c) higher production of perfect stockings

Processing Man-Made Fibres and Blends in the Cotton Industry*

Mill technique and practice in blending, opening, carding, drawing and drafting of rayon staple, "Courtelle," "Celafibre," "Tricel" and nylon, etc.

By E. HAYHURST†

RAYON staple has been in constant use in the cotton industry for a considerable number of years and during that time many mills have become very proficient in processing it, but in commenting on this subject I want first to enumerate some of the various types of rayons and synthetics now obtainable and in increasing use in the industry at present.

"Fibro"
(Courtaulds rayon staple)

1½	den.	1 7/16	in. bright
1½	,,	1 7/16	in. matt
3	,,	1 7/16	in. bright
3	,,	1 7/16	in. matt
3	,,	2½	in. bright
3	,,	2½	in. matt
4½	,,	2½	in. bright

"Courtelle" (Courtaulds acrylic fibre)				"Celafibre" (British Celanese acetate staple)			
2	den.	1 7/16	in.	3	den.	1 7/16	in. matt
3	,,	2½	in.	3	,,	2½	in. ,,
4½	,,	2½	in.	4½	,,	2½	in. ,,

"Tricel" (British Celanese triacetate staple)				Nylon			
3	den.	1 7/16	in.	1½	den.	1½	in. or 1⅝ in.
3	,,	2½	in.	3	,,	1½	in.
4½	,,	2½	in.	3	,,	2½	in.

Various blends are made from these fibres and with other fibres including, of course, the natural fibres such as wool and cotton, etc. It is extremely important in dealing with blends to accurately identify the qualities during processing and to make certain that usable wastes get back into the correct mixing. If a small quantity of cotton got into the wrong mixing in a cotton mill little damage would be done, because all cottons have the same basic characteristics. But, if the same thing occurred with rayons or synthetics nothing would be seen until the yarn was woven and dyed and then the effect would be most striking and disastrous, resulting, as it would, in a streaky patch in the cloth where the foreign fibres had reacted differently to the dyeing process. To prevent this sort of thing happening it is advisable to use tints to identify the packages and the usuable wastes. "Celafibre" and "Tricel" staples are usually tinted in the bale when they leave the works.

Blending

Blending should always be done from as many bales as it is economically possible to use, and in this country we tend, I think, to fall behind both American and Continental spinners. In the report of the Federation of Master Cotton Spinners on the Milan Exhibition it was mentioned that four mills on the Continent were visited by Mr. Jolly and his colleague and, in comparison with any of our English practices, in each case their blending was being carried out from a relatively larger number of bales.

In the first mill visited using only one blender 150 bales were lying in 10 batches of 15 bales each, all being at different levels and as one batch was used another 15 bales were opened. In the second mill, with 3 blenders 12 bales were at each machine making a total of 36 bales in use at any one time. In the third mill 4 blenders were being fed by 45 bales, each making an 180-bale mixing and in addition a further 180 bales were standing open so as to reach equilibrium with the room temperature and humidity. In the fourth mill 2 blenders were each fed by 46-bale mixings which had stood in a conditioned atmosphere for 48 hours.

Opening

Standard opening lines are usually satisfactory for synthetics, except in cases where "Crighton" openers are used, these should be by-passed. If possible, hoppers should be emphasised and used at the expense of beaters. In hoppers it may be found that stripping rollers which have been working satisfactorily on cotton will be found to be unable to keep the lattices stripped. It has been found from experience that the leathers on the rollers or beaters should be changed for wider ones, usually about ½ in. wider and should be "V" cut to intersect the spikes of the lattices.

Rayons are handled quite as easily as cotton on single process systems. Longer stapled fibres, especially matt fibres, are not delivered from cage deliveries quite as cleanly as may be desired but I would recommend multiple feed trunks at this point or, the Shirley wheel as an alternative. Porcupine or Kirschner beaters have been found to be best, used at the correct speeds.

Lap making does not present any problems and Shirley lap felters are a very great help in unrolling the laps. Slip rollers will be easier to withdraw if the weight is reduced on the brake pedal and extra weight added to the calender roller weight lever. One simple method of removing slip rollers comprises a lever fitted with a claw to slip over the knob of the roller.

If all "Courtelle" or all nylon is being processed it is particularly advisable to reduce the weight per yard of the lap. Nylon will also require rovings to bind the lap and to prevent ballooning behind the calender rollers which, if allowed, will inevitably lead to choking and possibly a breakdown. Transporting nylon laps is not an easy job and great care must be taken or an excessive amount of waste can be made at this stage. It is probably better in the long run to wrap the laps in paper.

Carding

Standard flat cards need very little modification to effectively handle blends. Flat speeds may be reduced for some of the fibres to reduce the amount of waste loss, but I would

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* *A paper given recently to Rochdale Cotton Spinning Mutual Improvement Society.*

† *Head Carder, Arrow Mill, Courtaulds Ltd.*

(left) Fig. 1.
(Right) Fig. 4.

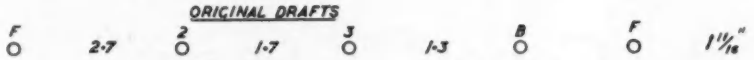
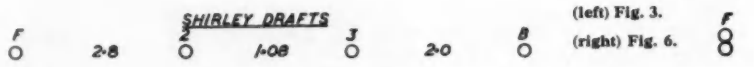
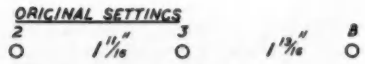


Fig. 2.



(left) Fig. 3.
(right) Fig. 6.



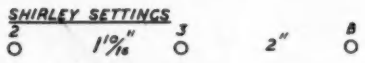
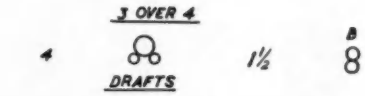


Fig. 5.



recommend that "Courtelle" or nylon be carded with cotton flat speeds, or even more. This helps to prevent the cylinder wire filling up too quickly to give rise to very cloudy webs. Stripping can be done with an uncovered brush because there is no dust of an injurious nature present. Stripping times are, of course, arbitrary but I would suggest that every three hours would be quite sufficient unless a falling off in web quality was marked.

Settings for Egyptian cotton will give good results for most rayons and a rigid programme of card setting is essential. Card productions of up to 15 lb./hour may be obtained but nylon and "Courtelle" should be carded at a slower rate, say about 7 lb./hour. At Arrow Mill it has been found necessary to use fancy rollers on the cards when processing 1½ den. 1½ in. staple nylon.

Longer staples card very well but some difficulty may be experienced at the feed roller caused by the taker-in plucking in the lap. One method of overcoming this problem is to have the feed rollers turned down and covered with saw-toothed wire wound on in a reverse direction to hold the fibres, thus preventing the taker-in plucking them. This does not present as big a job as it may seem, because wherever the taker-in is sent to be re-covered, they probably do the work at a reasonable charge. It is interesting to note that the feed rollers will work quite efficiently if at any time afterwards it is necessary to revert back to cotton.

Drawing

Of all the frames in the mill, the drawframe is one, if not the most important. It is quite impossible to produce a good yarn if a regular drawn sliver is not produced and processing rayon staple at the drawframe calls for the best possible conditions, both in temperature and humidity, and also in the mechanical efficiency of the machine.

Weighting of a standard pattern is quite satisfactory although I would not recommend the use of a graduated system, e.g., the lighter weights at the back roller and the heavier ones at the front. This sytem is prone to roller slip and the results of this can be disastrous in both yarn count variation and weak places in the yarn.

The Shirley method of drafting at the drawframe can be employed to great advantage and I strongly recommend this system. To dwell a little on the Shirley system I would like to point out that a lot can be done in the mill by carders without involving the firm in a lot of expense. The Shirley drafting system recommends the use of fluted rollers which, as shown in Fig. 1, have been modified as to the angle and width at the top of the flutes.

It is possible, however, to re-arrange the brake drafts without any more trouble than to change one wheel which will speed up the third roller thus increasing the back zone draft and reducing the middle zone draft. The re-arranged drafts should then be something like those shown in Figs. 2 and 3.

Roller settings are also slightly different for Shirley draft as indicated in Figs. 4 and 5.

Another system which has gained in popularity is the 3 over 4 system (Fig. 6) which, in my opinion, is very superior to either the conventional system or the Shirley system.

Processing 2½ in. staples present no problems at the drawframe. On standard types of frames it is achieved by removing the 2nd roller, using entirely the three larger diameter rollers and slightly increasing the back zone draft by the same method as used in Shirley drafting (see Fig. 7).

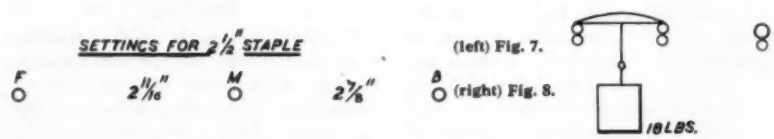
Before leaving the drawframe I want to stress most strongly the importance of keeping clearers, top and bottom, in good condition, also that an efficient selvedge guide be used. Trumpets with the longer reach are an advantage and a slightly smaller hole gives a reasonable amount of sliver condensation and thereby increases the quantity in the can. Speeds up to 450 r.p.m. for 1½ in. dia. rollers may be used and productions of 1,000 lb./delivery are possible.

Speedframes

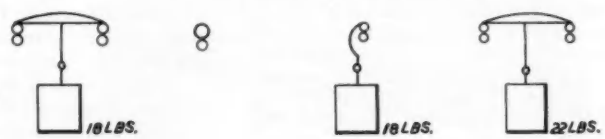
Few alterations are necessary here when changing to staple fibre. Rayon lies closer than cotton and thus requires builder wheels or rack wheels, as we are accustomed to call them, to have a greater number of teeth to slow down the movement of the cone belt, thus compensating for the smoother rovings which will not build up the bobbin at the same speed as with cotton.

Some care should be taken with bobbin building, because winding too tightly may create ratched roving and will also cause the roving to run under or over at the cones. The various types of roller arrangements can usually be employed. I refer, of course, to the self-weighted back rollers and also the dead-weighted type (see Fig. 8).

As far as high draft systems are concerned, I would recommend the 4-line 2-zone system. Processing of longer staples of up to 2½ in. is achieved satisfactorily on speedframes, although on older machines we are limited to the all-leather top roller system, because it requires the use of 2 lines of rollers



(left) Fig. 7.
(right) Fig. 8.



only and the self-weighted back roller is not quite good enough to hold the fibres in a 1-zone drafting frame. So we are limited to the use of leather-covered top rollers back and front each weighted separately (see Fig. 9).

Another type of roller arrangement we have found very successful is the 2 over 3 system which consists of a large diameter top roller resting on two fluted rollers in one slide and weighted with a saddle (see Fig. 10). Roller centres may be set inside the staple length due to the nip of the middle roller being inclined backwards and by this method a better control of the fibres is obtained due to the arc of the fluted roller being in contact with the fibres during the drafting process.

Fig. 9.

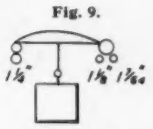


Fig. 10.

Warp Knitted Nylon Shirt Fabrics

THE interest of the trade, and of wearers, in nylon warp knitted shirts has been stimulated by recent important improvements in the techniques of making-up and collar manufacture. This Report, anticipating a marked increase of demand, offers some suggestions on fabric constructions suitable for shirtings, taking as their basis the need to achieve good standards in opacity, handle, stability and resistance to snagging and abrasion.

The three important variables are, of course, yarn denier, pattern notation and stitch density. Of the great many possible constructions in which skilful use of these variables can be made, some typical examples are printed at the end of this Report.

Machines and Yarns

All types of warp looms with two or three guide bars are suitable. Satisfactory fabrics are being manufactured on 28, 30 and 32-gauge machines. The nylon yarn most commonly chosen for warp knitted shirtings is 40/13/$\frac{1}{2}$ Type 500, but, 30, 60 and 70 den. yarns are also employed. Dull rather than semi-dull yarns are preferred, because of the greater opacity they afford.

Plain and Striped Shirts

Plain white or plain dyed shirtings can be produced on two or three guide bar machines, whereby two guide bars are normally fully threaded, and a third bar—if used—either fully or partly threaded. Two guide bar shirtings with one fully threaded and one partly threaded bar are also being produced, and are acceptable, provided the requirements of stability, opacity and resistance to snagging are met.

Striped shirtings can be produced on two or three guide bar machines with any of the above-mentioned white yarns in the back guide bar (or bars) and coloured yarns in the front and/or middle guide bar. For a three guide bar fabric the front bar can be either fully threaded with a mixture of white and coloured yarns, or partly threaded with coloured yarns only.

Pattern Notations, Yarns and Stitch Densities

Several pattern notations are given as a general guide. Pattern notation alone does not, however, determine the properties of the fabric, but must be considered with yarn denier and stitch density. For example, whilst a reverse locknit knitted from a 60 den. yarn at, say, 2,200 stitches/sq. in., may give a firm and non-transparent fabric, the same construction at 1,500 stitches/sq. in. may be totally unacceptable. Conversely, a 30 den. sharkskin construction may give a transparent and unstable fabric at 1,800 stitches/sq. in., but may be perfectly satisfactory at, say, 2,600 stitches/sq. in.

Example of a 60-denier Plain Shirting Fabric

Manufacturing details	Front bar	Back bar
Yarn	60/20/$\frac{1}{2}$	60/20/$\frac{1}{2}$
Threading	Full set	Full set
Run-in	50 in./rack	84 in./rack
Pattern notation	1-2, 1-0	1-0, 3-4

Knitting quality: 62 courses/in. on the machine.
Fabric quality: 55 courses/in. (finished), 34 wales/in. (finished).
Weight/sq. yd.: Approx. 4·0 oz. (finished).

Example of a 40-denier Striped Shirting

Manufacturing details	Front bar	Middle bar	Back bar
Yarn	40/13/$\frac{1}{2}$ Type 500, white and 40/13/5 Type 100, black	40/13/$\frac{1}{2}$ Type 500, white	40/13/$\frac{1}{2}$ Type 500, white
Threading	4 white, 1 black	all white	all white
Run-in	46 in./rack	49$\frac{1}{2}$ in./rack	86 in./rack
Pattern notation	1-0, 0-1	1-0, 1-2	3-4, 1-0

Knitting quality: 56 courses/in. on the machine.
Fabric quality: 62 courses/in. (finished), 30 wales/in. (finished).
Weight/sq. yd.: Approx. 3·5 oz.

Four Examples of Pattern Notations for Two Guide Bar Shirting Fabrics

	Front bar	Back bar	Remarks
(1)	1-0, 1-2	3-4, 1-0	Suitable for plain shirts
(2)	1-0, 0-1	3-4, 1-0	Suitable for striped shirtings
(3)	1-0, 0-1	2-3, 1-0	
(4)	1-0, 1-2, 2-3, 2-1	2-3, 2-1, 1-0, 1-2	Only suitable at high stitch densities.

Four Examples of Pattern Notations for Three Guide Bar Shirting Fabrics in the Recommended Yarns and Combinations

	Front bar	Middle bar	Back bar	Remarks
(1)	1-2, 1-0	1-0, 1-2	2-3, 1-0	Suitable for plain shirts
(2)	1-0, 1-2	2-3, 1-0	1-0, 1-2	
(3)	1-0, 0-1	1-2, 1-0	1-0, 2-3	For striped shirtings: front bar fully threaded with white and coloured yarn
(4)	1-0, 0-1	1-2, 1-0	1-0, 3-4	For striped shirtings: front bar partly threaded with coloured yarn only

Work Study in a Woollen Mill: Warping

In this study the warping operation has, for convenience, been separated into four parts. An explanation is given of the control and bonus methods suggested for the scheme

By "TEXTILE TECHNOLOGIST"

THE scheme set out in this article arises from investigations in the warping department in a woollen mill and gives some detail of the control and bonus methods suggested. It is convenient to separate the operation of warping into four parts, of which three are independent of the number of cuts on the warp. These parts are set out in Table 1.

Table 1

Operation	Typical Value in AM's	
	Cop	Cheese
(1) Creel-up	37	60
(2) Set-up	17	17
(3) Warp on to Balloon		
6 cut	448	172
2 cut	205	—
(4) Break out	13	17
AM's per Warp		
6 cut	515	266
2 cut	272	—
AM's per cut		
6 cut	86	44
2 cut	136	—

The work values for warping depend on the variables given in Table 2.

Table 2

(1) Number of supply packages in creel	N
(2) Number of sections in warp ..	S
(3) Number of cuts in warp ..	C
(4) Number of cops to be replaced in creel during running time	R

The fundamental expressions for the work values in allowed minutes per warp are set:

$$\text{Warping from cop} \quad V = 43 + 0{\cdot}22N + S(7{\cdot}4 + 1{\cdot}25C) + 1{\cdot}8C + 0{\cdot}41R$$

$$\text{,, ,, cheese} \quad V = 48 + 0{\cdot}31N + S(7{\cdot}4 + 0{\cdot}94C) + 1{\cdot}8C$$

$$\text{Where } R = \frac{(73 \text{ or } 80 \text{ yds.} \times S \times C)}{256 \times \text{skeins} \times 32 \text{ lbs.}} - 1 = \text{No. of cops to be creeled in during running}$$

For the sake of ease of working a list of work values per warp from cop or cheese could be calculated for values S, N, C and R covering the usual types of warp in current production.

Table 4

Bonus Rate = 98s. 1d for 45 hours Warpers' Bonus Scale

True Perf.	Pay Perf.	Bonus	Bonus per 9 hrs.	Bonus per 18 hrs.	Bonus per 27 hrs.	Bonus per 36 hrs.	Bonus per 45 hrs.
			s. d.	s. d.	s. d.	s. d.	s. d.
50	60	nil	nil	nil	nil	nil	nil
51	61	1·6	0 4	0 8	0 11	1 3	1 6
52	62	3·3	0 7	1 3	1 10	2 6	3 2
53	63	4·9	0 10	1 10	2 9	3 9	4 9
54	64	6·5	1 3	2 7	3 8	5 1	6 4
55	65	8·2	1 7	3 2	4 8	6 5	8 0
56	66	9·8	1 10	3 9	5 8	7 8	9 6
57	67	11·5	2 2	4 5	6 9	9 0	11 4
58	68	13·2	2 6	5 1	7 9	10 4	12 10
59	69	14·9	2 10	5 9	8 9	11 7	14 6
60	70	16·7	3 3	6 6	9 9	13 1	16 4
61	71	18·2	3 7	7 2	10 9	14 4	17 10
62	72	19·9	3 11	7 10	11 9	15 7	19 6
63	73	21·5	4 3	8 5	12 9	16 10	21 1
64	74	23·2	4 7	9 1	13 8	18 2	22 8
65	75	24·9	4 11	9 9	14 8	19 6	24 5
66	76	26·6	5 3	10 5	15 8	20 9	26 1
67	77	28·3	5 7	11 1	16 8	22 2	27 9
68	78	30·0	5 11	11 9	17 8	23 6	29 5
69	79	31·7	6 2	12 5	18 8	24 9	31 1
70	80	33·2	6 6	13 1	19 8	26 0	32 7
71	81	34·9	6 10	13 8	20 7	27 4	34 3
72	82	36·6	7 2	14 4	21 7	28 8	35 11
73	83	38·1	7 6	14 11	22 7	29 11	37 6
74	84	39·8	7 10	15 7	23 7	31 2	39 0
75	85	41·5	8 2	16 3	24 7	32 5	40 8
76	86	43·0	8 6	16 11	25 6	33 8	42 3
77	87	44·7	8 10	17 7	26 6	35 1	43 11
78	88	46·5	9 2	18 3	27 5	36 5	45 6
79	89	48·3	9 6	18 11	28 5	37 10	47 3
80	90	50·0	9 10	19 7	29 5	39 2	49 0

Beaming

This is carried out by indirect labour and no attempt has been made to include this in the work value per warp. No process allowance is necessary to compensate the operative for time lost during beaming-up as breaking-out may be carried out simultaneously with this operation, provided that several warps do not finish together.

Table 3

True performance	50	60	70	80
Pay performance	60	70	80	90
Bonus % of time rate	Nil	16·7	33⅓	50

Indirect Labour

It is suggested that the operative who deals with beaming for the warping department should receive bonus as an indirect based on the departmental performance, such bonus being paid on half his weekly working hours. As the operative could also take charge of say weft winding, bonus on the other half of his weekly hours would be based on the performance of the pirn winders.

Form of Bonus Scheme

It is recommended that each operative should receive a daily credit of allowed minutes given by the number of warps multiplied by the appropriate work value per warp. The operatives true performance will be obtained by dividing the credit by the hours worked, and bonus will be paid for performance in excess of 50 A.M's per hour on the scale given in Table 3.

The performance figure is then converted to bonus payable by the Table 4. The wages payment is based on 98s 1d. for 45 hours.

Waiting and Cleaning Time

Where a warper is waiting for any reason outside her control, i.e. waiting for work, or breakdown, such time,

Table 4

Actual Performance	40	50	60	70	80	90	100
Pay Performance	60	65	70	75	80	85	90
Bonus % of time rate ..	Nil	8⅓%	16⅔%	25%	33⅓%	42%	50%

Available Earnings

With the present work supply the departmental performance will be about 58 AMs per hour which gives a pay performance of 69, corresponding to 15% bonus. Available earnings will be of the order set out in Table 5.

Table 5

	At 69 Performance	At 80 Performance	For Previous 54¾-hr. Week
Foreman	£ 6 14 4	£ 7 5 10	£ 6 5 0
Man	5 3 10	6 0 5	5 11 8

Results Available

When the output in pieces per week has increased, a standard performance of 80 AMs per hour is to be expected from the department. The cost resulting from this performance (standard cost) will then be:—

	per 1,000 AM's
Direct labour	453d.
Indirect labour ..	139d.
Total ..	592d.

The saving available as compared with the reference cost is therefore:—

	per 1,000 AM's
Direct labour	422d.
Indirect labour ..	52d.
Total ..	474d.

This represents an annual saving of about £350 or 40%. At the present level of output of 4,000 AMs per week the performance will be limited to 58 (true), and the saving against reference will be:—

	per 1,000 AM's
Direct labour	337d.
Indirect labour ..	Nil
Total ..	337d. or 31%

N.B. The pieces mentioned in this Report are 54/56 ins. wide × 60/65 yds. long finished.

Reviews

PHYSIOLOGY IN INDUSTRY. Lucien Brouha. Pergamon Press Ltd., Headington Hill Hall, Oxford (price 40s.).

Industry and, in turn, our whole society is concerned with efficient operations and one of the principal factors required for industrial wellbeing is suitability of working conditions. Mechanisation and automation, together with the development of safety devices have improved the worker's health and efficiency in many industries, but modern discoveries and new speeds of production have created other problems and the need for utilising man's muscular energy is still far from being eliminated. The study of the physiological expenditure involved in work is only in its early stages and industry has not, so far, used what knowledge has been gained.

Dr. Brouha, a distinguished medical specialist and an honorary professor of Liége University, points out in this connexion that an engineer would not use a machine without knowing its characteristics: power, optimum speed, efficiency of production. Why then should the attitude change when the use of the human machine as a source of mechanical energy is the problem?

Dr. Brouha has been engaged for many years in the evaluation of industrial stresses by the physiological reactions of the worker, first for the Aluminium Company of Canada and, more lately, for the E. I. Du Pont de Nemours Company, being now Chief of the Physiology Section of Du Pont's Haskell Laboratory for Toxicology and Industrial Medicine. This monograph is based largely on the results of plant surveys and laboratory experiments carried out for these employers.

The first two chapters describe the main physiological responses to muscular work and the influences of age, sex, fitness and state of nutrition. It is only in a favourable environment that man can produce sustained effort and at the same time remain in good physical condition and, in the second part of the volume, Dr. Brouha explains how physiological reactions are affected by the working environment with particular attention to the evaluation of heat stress, a problem which, combined with that of high humidity, is found in textile and paper mills.

To this section Dr. John A. Zapp, Director of the Haskell Laboratory, contributes a chapter on the physiological evaluation of the chemical environment. Relatively little is known about the physiological effects of many of the great number of new chemicals brought into use and the industrial physician has two most practical problems to face in considering the toxicity hazards of chemicals and the early detection of their toxic effects. The third part of the book describes methods of evaluation of the physiological requirements of jobs and methods used to reduce stress and fatigue.

A final chapter deals with the selection, placement and supervision of workers.

S.P.S.

* * *

SOAP FILMS. By Prof. K. J. Mysels, K. Shinoda and S. Frankel. Pergamon Press, Headington Hill Hall, Oxford. 1959. Pp. 116 (price 40s.).

The book is an account of research and investigations into the process by which a film of soap solution, or the like, comes to be thin. It describes a number of calculations, experiments and even speculations on the subject. The first two chapters deal mainly with the physico-chemical properties of surface-active agents, the other sections of the book describe physico-chemical aspects and the behaviour of soap films. There are many literature references within the text and there is a bibliography with over 300 references. The authors have undoubtedly packed into this book a tremendous amount of valuable information and scientists and research workers will welcome this splendid contribution by American authors, two of whom are professors at the University of Southern California.

B.S.

* * *

SYSTEMATIC ANALYSIS OF SURFACE-ACTIVE AGENTS. By Milton J. Rosen and Henry A. Goldsmith. Interscience Publishers, New York and London. 1960. 422 pages (price 102s.).

With the large number of surface-active agents and detergents now available, it seems necessary and even imperative, to analyse such products. Many papers on the subject have appeared in the literature, but it is for the first time that a comprehensive treatise on the analysis of surface-active agents has been written and published.

Surface-active agents can be divided into anionic, cationic, nonionic and ampholytic types and while this classification has been found useful for product formulation and application, it has not been found adequate for either qualitative or quantitative analysis. For this purpose the authors suggest an entirely new classification based on elemental and functional group analysis and they tabulate the various types of surface-active agents, classified by the new system, in 13 tables at the beginning of the book. This is followed by chapters on detection, isolation and estimation of surface-active agents in compositions, methods and procedures for the qualitative and quantitative analysis, and methods for the separation and analysis of mixtures. In an appendix are tables of representative commercially available surfactants and of refractory indices of surface-active agents and their raw materials.

The authors present a systematic scheme for the detection, identification and analysis of surface-active agents and, apart from traditional methods, they also devised and recommend new qualitative tests for the determination of such products. The book is well written and documented with literature references at the end of each section. It will serve as an excellent guide and text-book for workers in this branch of industry.

B.S.

Binding the Pile in Carpet Backings

In this article the author confines his observations mainly to Wilton looms weaving patterns and the methods that can be employed to overcome the problem of pile binding when it arises

By H. KIMBERLEY*

ONE of the most important factors in carpet manufacture is tuft bind, i.e., binding of the wool or worsted pile into the carpet backing and in this article it is intended to deal only with Wilton looms weaving patterns and the methods that can be employed to overcome this problem should it arise. In practice, 27 and 36-in. looms are most easily dealt with, but the wider the carpet becomes more care must be exercised in the mechanical setting and timing of the loom also in the composition of the tuft and backing materials.

At different times all manufacturers of wide carpets have experienced this lack of tuft bind, and where it is noticed most in pattern weaving, is generally on runs of plain colour, or "ground." Resistance to plucking (or tuft withdrawal), will sometimes show several variations across a wide carpet and in efforts to overcome this difficulty counts of yarn, composition of blend, density of backing, thickness of cotton warp, counts of cotton, counts of jute or linen wefts, rubberised, glued, and starched wefts, have all been tried to obtain the right combination and ensure correct bind. Some manufacturers using a slightly heavier count of yarn in the "ground" colours find this helps considerably. It is impossible to lay down any hard and fast rules regarding the types of materials to be used in carpet manufacture, due to the many variations in yarns, the jute, and cotton used by the different makers, and as the cost of making a wide carpet is considerable it must be taken for granted that firms making them have all at some time experimented with these different grades of materials to find the perfect construction.

Assuming that a good cotton warp is used and an even weft (use of an even weft is important due to "face" appearance), then on the mechanical setting and timing of the loom depends whether the warp tension is adequate or inadequate. When the warp tension is correct the tuft bind will be the most effective. It is essential for the treadle box cams to be correctly set and similar detailed attention should be given to the two warp cams, also the gear levers and studs and the bowls that run in the cam races. Where possible, the cam races should be machine cut. For preference a good profile cutting machine should be used, and the bowls that run in them should be turned to ensure minimum back-lash.

Timing

When the mechanic is satisfied that the machining is accurate the cams can be set. It is important that the gears carrying the warp, or cotton shed, should both rise and fall the same distance, and as one cam is directly opposite the other, they can easily be balanced up with calipers, or similar method of measuring. When all the cams, including the jacquard lift ("lash" to give pattern), and stuffer, carrying jute for carpet backing, are all set to satisfaction, then the timing of the loom, and jumbo weights should be dealt with.

On double-beat looms, the cams carrying the cotton should be so timed that the complete motion of changing gears should commence on the first beat of the sley and carefully balanced to finish on the second. When both gears are level (Fig. 1) the sley should be right forward to bump the weft into place but when setting the brake motion on cotton jumbo (Fig. 2) care must be taken to get maximum braking just before the two gears are level. This enables weight to be taken off the cotton when the weft is bumped up for the first time. As the cranks go up, the brake releases slightly, the cotton tightens up and as the cranks go down the operation is repeated, thereby getting maximum binding of weft to the yarn.

Jumbo weights to hold the cotton tight are to a large extent determined by the material used, and pitch of the work being made. On 27-in. width of carpet, more weight is required for 256 pitch than 214 pitch, or poorer quality. Different jumbo weights will also alter the width of the carpet to a small extent, but once the correct weights have been set by the tuner they should on no account be changed by the weaver. Very wide looms, from 10 to 20/4 have sometimes as many as 20 to 30 weights each weighing 15 to 20 lbs. on each side of the jumbo, and because the weaver has to remove and replace them at different times, due perhaps to a weaving error or the tying in of a new cotton or stuffer beam and in these circumstances it is easy to see that one extra weight or one short can easily occur.

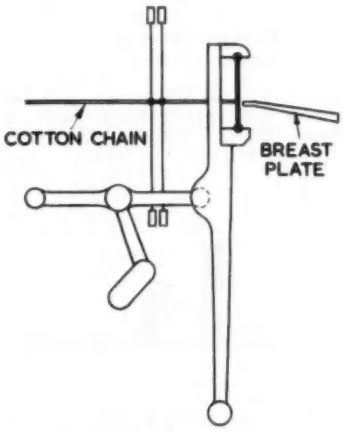


Fig. 1. Both gears level

Large factories with a number of wide looms would find it advantageous to have a record, kept by some responsible person, which details the history of the various qualities of carpet that have been woven on the loom, i.e., no. of loom, pitch of sley, change wheels, pattern numbers, weights used on yarn, and the number of weights used on chain and stuffer jumbos, etc. This will save considerable time in "matching" and make of the carpet and where an order is repeated the information is immediately available as to which loom

*Works Engineer, Morris and Co. (Kidderminster) Ltd.

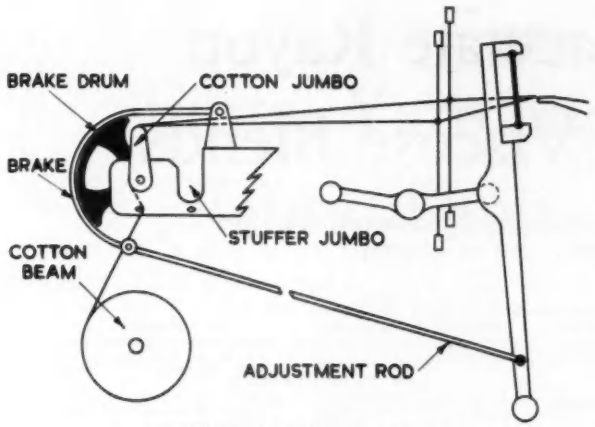


Fig. 2. Jumbo brake motion

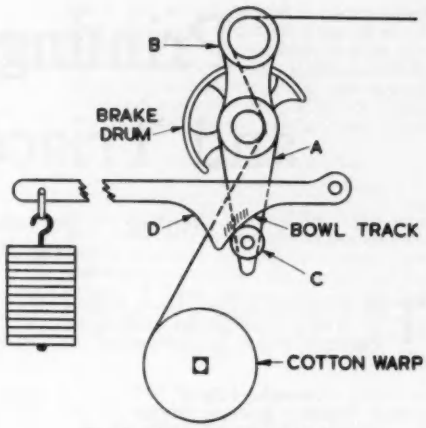


Fig. 3. Brake drum and details

it was woven on, also the full particulars. It has been found that several yards of carpet of the same quality, woven on a wide loom, can have different degree's of binding due to weights being altered.

The jumbo brake motion (Fig. 2), on narrow widths of carpet looms are sometimes dispensed with, and extra weights are placed on the jumbo. This puts enough tension on the cotton warp to ensure correct bind and while the method works satisfactorily on looms up to 4 or 5/4 widths, is not advisable on anything wider. It is possible to get good results on wide looms by using excessive weights but the mechanical parts of the loom are subjected to terrific strain which is totally unnecessary and should be avoided in all cases. Lower the weight used on a loom and less the prospects of wear, breakages and loss of production. It must be understood, that however good a wide loom is mechanically a large amount of weight is still necessary on the cotton warp to ensure good bind, and if the brake motion was the only method of holding the jumbo, while the sley bumped up the weft, it would be so big that it would be out of all proportion to the rest of the loom.

To overcome this problem, on most wide looms instead of a direct arm and weight on the jumbo, there is a toggle motion which when working right is extremely effective (Fig. 3). The short lever A is keyed on the main jumbo shaft, in line with jumbo B, and a stud and bowl at the end C holds the lever carrying the weights at the right height. The lever D is of cast iron or malleable material and the track of the bowl is a slight curve. Only a small brake drum is used with this arrangement and due to the effective way it works (Fig. 3) (easing of tension when shafts are level, and tightening when opening) the brake drum need only have light adjustment.

It must be pointed out that any wear in the bowl track, on the main lever will defeat its object, and as wear is inevitable, this should be checked first if tuft withdrawal occurs. In this

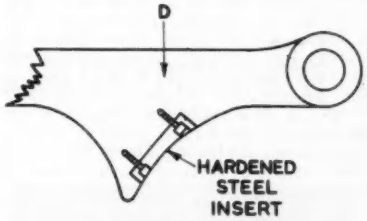


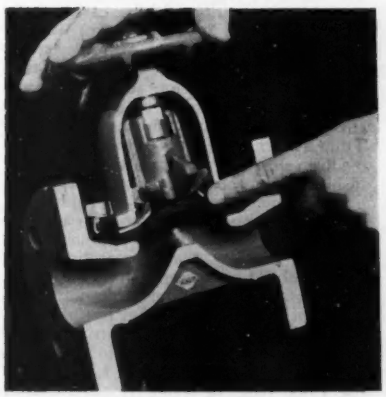
Fig. 4. Hardened steel inset

event the lever should be replaced, and the old one could be rebuilt to its original shape by welding. As the track of the bowl does not extend to the end of the curve, it would simplify the mechanism and waiting time, by machining a section out of the bowl track on the lever and having a hardened steel insert screwed into place (Fig. 4). After the initial time and cost of machining the levers had been done the changing of the insert would only take a matter of minutes without interfering with production. The weaving of high pile carpet on wide looms should be mentioned in conclusion, as the higher the pile wire, the greater the angle of yarn, from the top to the bottom of the wire, and the necessity to bump the weft well home. In view of this more attention should be paid to setting, timing, and weights to avoid any possibility of tuft withdrawal.

Valve Diaphragms

"Terylene" is being increasingly used by the rubber industry as a reinforcement for conveyor belting, "V" belts and industrial hose. Now Saunders Valve Co. Ltd., Cwmbran, South Wales, has developed an entirely new use for "Terylene"—as a reinforcement for diaphragms.

Extensive tests proved, it is said, that "Terylene" was stronger, lasted longer and was generally more satisfactory than the materials previously used for this job. As a result, Saunders Valve Co. is incorporating a "Terylene" reinforcement in the majority of their diaphragms. Here a sectioned "A" type Saunders diaphragm Valve shows the "Terylene" reinforcement.



* * *

OVERSEAS NEWSPAPERS AND PERIODICALS GUIDE BOOK. Publishing and Distributing Co. Ltd., 177 Regent Street, London, W.1 (price 30s.).

Business houses contemplating overseas publicity campaigns will find this guide, appearing in its seventh and much enlarged edition, of great usefulness. Essential information is furnished relating to more than two thousand newspapers and periodicals arranged according to the world's principal market areas and also by classification of subject matter. Short articles on each country or area covered precede each section.

Printing Triacetate Rayon and Triacetate/Viscose Blends*

Printing recipes and processing techniques, and instructions when using Procinyl, disperse and vat dyestuffs

THE behaviour of the classes of dyes of principal interest for printing on triacetate rayon is summarised in Table 1.

Table 1

Class of Dyes	Light Fastness	Washing Fastness	Fastness to Steaming	Remarks
PROCINYL	Good - very good	Very good - excellent	Excellent	Steam under pressure, or alternatively at atmospheric pressure with Tumescal PH in the print paste.
DISPERSE	Moderate - very good	Moderate - good	Moderate - very good	Suitable for the production of a wide range of medium-to-full shades when steamed at atmospheric pressure. A few disperse dyes require pressure steaming to achieve maximum fixation.
VAT Alkali leuco ("all-in" process.)	Good - very good	Good	Moderate - good	Suitable for the production of a wide range of pale-to-medium shades.
Acid leuco process.	Moderate - good	Good	Moderate - good	Yield a short range of medium-to-full bright shades. Of interest to screen printers.

Procinyl Dyes

The general printing recipe is as follows:—

1 - 6 lbs. Procinyl dye are dispersed in a solution of 10 lbs. urea in 1½ - 1 gall. water, and the suspension is stirred into 6 gall. thickening made slightly acid with acetic acid and containing 1 lb. Resist Salt L and 1½ pints Perminal KB. Finally, the paste is bulked with 1 gall. water to 10 gall. A thickening of Nafka Crystal Gum Supra (Scholtens, Groningen, Holland) has been found to give level prints coupled with good definition and high colour value. When prepared by the above receipe, print pastes of Procinyl dyes may be stored for prolonged periods without significant loss in printing strength.

After printing, the goods are dried and then steamed. Steaming is carried out for 30 mins. at a pressure of 10 lbs./sq. in. If suitable pressure-steaming equipment is not available, full shades can be obtained provided an addition of 2 lbs. of Tumescal PH dispersed in 1 gall. of warm water is made to each 10 gall. of print paste, the quantity of water used to bulk to final weight or volume being adjusted accordingly. When steaming is carried out at atmospheric pressure, in the absence of Tumescal PH, the build-up is limited to a medium shade. Tumescal PH is practically insoluble in water. It is a redispersible powder which, on mixing with cold water, gives a fine suspension suitable for addition to printing pastes. Some aggregation of dye may occur if print pastes containing Tumescal PH are stored. To prevent this, such additions should be made only when the print pastes are ready for use.

The goods are finally rinsed in water and then treated for 5 - 10 mins. at 120°F. in a solution containing 2 parts of Lissapol ND per 1,000 parts of water, rinsed in water and dried.

Disperse Dyes

The general printing recipe is as follows:—

3 - 10 lbs. dyestuff paste, 2 - 5 lbs. dyestuff powder are diluted with 2½ - 2 gall. water, and the suspension is stirred into 6 gall. thickening containing ½ gall. Perminal K.B, 1 lb. Resist Salt L and ½ gall. polyethylene glycol (mol. wt. 200), bulked to 10 gall.

After printing, the goods are dried and steamed. With the majority of disperse dyes, satisfactory yields are obtained by steaming for 30 mins. at atmospheric pressure. However, in the case of the disperse dyes listed below, increased colour yield is obtained if steaming is carried out for 30 mins. at a pressure of 10 lbs./sq. in.:

Duranol Brilliant Violet BR; Duranol Brilliant Blue CB; Duranol Printing Blue B; Duranol Printing Blue G; Duranol Printing Blue Green B; Duranol Direct Black T; Duranol Printing Black JB; Duranol Printing Black NVN; Duranol Printing Black R.

The goods are finally rinsed in water and then treated for 5 mins. at 50°C (120°F.) in a solution containing 2 parts of Lissapol ND per 1,000 parts of water, rinsed in water and dried.

Vat Dyes

Selected Caledon and Durindone vat dyes may be applied to triacetate rayon using either (*a*) a recipe based on the conventional alkali carbonate-sodium sulphoxylate formaldehyde ("all-in") process or (*b*) a recipe based on an acid-leuco process.

(*a*) *All-in Process:* 5 - 20 lbs. dyestuff paste are thoroughly stirred with 2 - 1 gall. thin neutralised thickening and then added with constant stirring to 6 - 5 gall. thickening in which has been incorporated 0 - ½ gall. glycerine, 5 lbs. anhydrous sodium carbonate and 10 lbs. sodium sulphoxylate formaldehyde, bulked to 10 gall.

After printing, the goods are dried and steamed at atmospheric pressure. A steaming time of 30 mins. is required for full fixation to be obtained. The goods are then oxidised by treatment for 10 mins. at 105°F. in a solution containing 30 parts of hydrogen peroxide (20 vol.) and 5 parts of ammonia (sp. gr. 0·88) per 1,000 parts of water. Finally, the goods are rinsed in water and then treated for 5 - 10 mins. at 120°F. in a solution containing 2 parts of Lissapol ND and 0·5 part of soda ash per 1,000 parts of water, rinsed again and dried.

(*b*) *Acid-leuco Process:* The general printing recipe, using for example "Manofast"* (Hardman and Holden Ltd.) as the reducing agent, is as follows. A mixture of "Manofast" and swelling agent is prepared by milling or homogenising 5 lbs. "Manofast," 4¾ pints polyethylene glycol (mol. wt. 200) and 3 pints Glydote B (or BN).

From this mixture a stock printing thickening is prepared by mixing together 1½ gall. of the above mixture and 6½ gall. thickening. The final print paste is prepared by pasting together 5 - 20 lbs. dyestuff paste and 1½ gall. thickening and adding slowly, with continuous stirring, 8 gall. stock printing thickening, to give 10 gall. final bulk.

After printing, the goods are dried, preferably with hot air. If drying cylinders are used, it is recommended that the first two or three cylinders be lapped and the temperature of the remaining cylinders so reduced as to give the mildest drying possible without impeding production. The dried goods are steamed at atmospheric pressure for 15 mins. After steaming, the goods are oxidised and developed in a similar manner to that recommended for vat dyes applied by the all-in process.

Triacetate/Viscose Rayon Blends

On a triacetate/viscose rayon (50/50 type) blended fabric prints of good all-round fastness and solidity of shade are obtained from the use of selected Caledon and Durindone vat dyes applied by the alkali carbonate-sodium sulphoxylate formaldehyde (all-in) process. The recipe and processing details are similar to those recommended for printing by the all-in process on a 100% triacetate rayon fabric.

* *With acknowledgements to I.C.I. Ltd., Dyestuffs Division.*

Jute Plant for Jamaica

It is proposed to set up a jute manufacturing plant in Jamaica this year at a cost of nearly £1 million according to a report by Barclays Bank D.C.O. The Ludlow Corporation, U.S.A., is stated to be behind this new venture and jute, says the Bank, will be imported from India and milled in Jamaica for re-export to the U.S. and Latin America.

Society of Dyers and Colourists

Fibre, Yarn and Fabric Faults

IN the majority of cases the faults in finished fabrics which have been brought about by some defect in the fabric as received by the dyer, printer, or finisher, were not apparent until the fabric was finished, others though visible to some degree in the loom state became much more prominent during dyeing and finishing, said Mr. N. Jackson (Courtaulds Ltd.), in a recent address to the London Section of the Society of Dyers and Colourists. Textile finishers were at the end of a long sequence of operations which had gone into producing fabrics, only some of which were under their direct control and, not infrequently, they were left "holding the baby" unless the faults were so obviously not of their making or they could reasonable prove that the fabric was potentially faulty when received at their works.

Faults were defined as effects present in the finished fabric which were considered to be alien to the fabric or undesirable and in his lecture Mr. Jackson put them into categories related to fabric structure of yarn processing. Fibre and yarn properties could affect dyeing and lustre, and examples of the effect of chemical variations in yarns, and differences in the cross-sectional shapes of filaments, were shown. In one example, the differences in dyeing were brought about by different filament denier yarns, the shade difference being related to the light path through the filaments; a second example illustrated wrong ends showing through after printing. An acetate poult had light streaks caused by flat filaments giving a mirror reflection from the surface, while another fabric had been produced from a mixture of cotton and spun viscose, the cotton containing a lot of "dead" cotton giving light specks in the fabric, the basic cause of which was flat cross-section fibres.

A typical example of a merchant having obtained cloth from two weavers concerned acetate/viscose fabrics which had been piece saponified before dyeing and printing. The acetate had saponified at different rates in the fabric giving differences in shade upon dyeing. Another example showed weft bars where acetate in a cotton warp/acetate weft fabric had dyed differently due to differences in acetyl value after piece saponification. Differences in the shade of mixture fabrics made from acetate and viscose staple fibre were shown to be caused by differing percentage blends in one set of fabrics and by differences in the percentage titanium dioxide in the other set of fabrics.

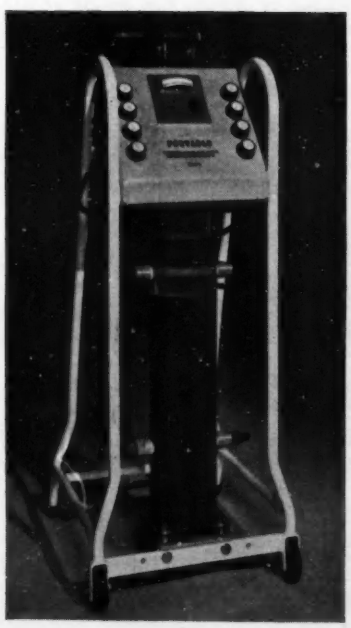
The more usual yarn structure faults were: count or denier variations, t.p.i. difference, twist direction differences and twist variation. Discussing faults under the heading of fabric structure, Mr. Jackson exhibited examples arising from difference in crimp, explaining that he was referring to the amount that a yarn bent when woven into fabric. The exhibits included a distorted haircord, and a ribbed viscose/cotton ottoman with a printed pattern which appeared to have slipped, leaving uncoloured ends. In the latter instance, the viscose had a 7% crimp and the cotton a 4% crimp, and the rib could be made to slide on the cotton warp. A further instance in later processing. In a second example of the same fabric the design was out of fit and it was found that the design was thrown "out of fit" abruptly between printing one piece and the next, due to a pronounced change in the degree of rib structure brought about by a marked difference in crimp of the two warps.

In another instance a difference in crimp between two warps resulted in a fabric that was gritty and one that was smooth. The fabric had an acetate and a viscose crepe warp alternately, and it was a case of which fibre went to the surface due to the difference in crimp. In the smooth fabric there was a high crimp in the acetate, which was the softer yarn, and in the gritty one the viscose crepe yarn had the greater crimp.

A subtle fault appeared in an 8-end satin, a weave having a number of twill lines which could be woven in two ways differing in the direction of the twill line. The warp was a low twist acetate and in one case the twist cut across the twill line, which was sufficient to roughen the surface of the fabric. A fault common in linings was stripiness of a lustrous nature brought about by variable end spacing. This could be rapidly detected by means of a line grating.

The next group of examples described by the speaker were of diamond barring brought about by periodic variations in yarn. These periodic variations could be introduced in yarn processing taking various forms, e.g. periodic differences in strain, twist, lustre or staining. Warp sizing troubles included different rates of drying when a sizing machine was stopped or running slowly, drying of acetate at too high a temperature in sizing, stained weft due to residual size, broken filaments in warp yarn caused by a stop during sizing, and twist disturbance producing spots and patterns.

Pure Water for Laboratory etc. Purposes



THE Mark 6 portable "Deminrolit" designed and manufactured by Permutit Co. Ltd., Gunnersbury Avenue, London, W.4, can convert up to 12 galls. hourly of clean cold water into demineralised water having a conductivity of less than 1·0 reciprocal megohm per centimetre: the quality of water produced by the unit conforms to the "Purified Water" standard of the British Pharmacopoeia, 1958. The new portable "Deminrolit" is a mixed bed ion exchanger. The ion exchange materials used are "Zeo-Karb 225" and "De-Acidite FF," manufactured by Permutit at their Chemical Production Division in South Wales.

The Unit is designed for simple and reliable regeneration on the spot. A conductivity tester is fitted which continuously monitors treated water quality. Constructed as a free-standing unit of robust, non-corrodible construction throughout, the Mark 6 is suitable for workshop as well as laboratory conditions. No expensive plumbing is necessary, the Unit being simply connected by flexible hose.

New Address

The registered Office of British Cotton and Wool Dyers' Association Ltd. is now Cumberland House Lissadel Street, Pendleton, Salford 6.

TEXTILE MACHINERY and MILL EQUIPMENT NEWS

Semi-Automatic and Manually Operated Baling Machines

The pneumatically operated unit—capable of four charges per minute—can be supplied with a power unit as an integral part of the equipment

TWO baling machines have been introduced by Medway Paper Sacks Ltd., Larkfield, near Maidstone. One is a pneumatically operated, semi-automatic unit capable of speeds of up to four charges per minute. The other is a compact, manually operated unit designed for use where space is restricted and output is limited. The machines suitable for all types of baling operations, are fully adjustable and one of the most interesting applications is in the wool industry, where wool tops are now being packed in quantity in Medway multiwall baler bags.

Pointing out that the use of multiwall baler bags can reduce packaging costs, the makers say it effects a saving in container cost and tare weight, in addition to economy in the storage space. The goods being tightly packed, allow the strain of handling and carriage to be distributed evenly over all interior package surfaces. Furthermore, high stacking will not collapse or deform the package. As with all multiwall paper sacks, baler bags are tailor-made to suit the specific requirements of any substance or product being packed. Barrier plies can be incorporated in the construction to provide protection against moisture, oil, grease and any other hazards.

The compressed air-operated Medway semi-automatic baling machine can be supplied with a power unit as an integral part of the equipment, or to work in conjunction with an existing air line. The compressor capacity alters according to the number of charges per minute and the length of stroke, but generally 17 to 20 cu. ft. of free air per minute is required with an air line providing a pressure of 100 lb. p.s.i.

The equipment is completely mobile, but the machine can be supplied for a permanent siting. The unit provides an automatic aid to the filling of multiwall baler bags, and can be fed manually or linked to a production line for automatic feeding. Robustly constructed, it is fully adjustable and can be constructed or modified to suit the requirements of any product being packed in this manner.

Operation is simple, quick and efficient, and conforms to a cycle of operation that is compatible with a minimum operator-necessity. To begin the sequence of operations, the operator depresses a foot pedal which collapses the bag jaws of the machine and the baler bags is slipped on. When the foot pedal is released the jaws revert to their operating position thus opening the baler bag, the mouth of which is then formed ready to receive the charge.

(left) The Medway semi-automatic baler showing the loading operations in progress. This photograph was taken at one of the mills of Woolcombers Ltd. This company, with Medway Paper Sacks Ltd., a member of the Reed Paper Group, has pioneered the use of multiwall baler bags for packing wool "tops"
(below) View showing the charged hopper with the bag held ready to receive the tops

The Medway hand operated machine, providing a hand assisted aid for filling baler bags

The units to be loaded are placed in the desired formation in the hopper, one side of which is movable. The closing of the hopper cover sets in motion the sequence of compressed air operations. The side ram moves in to tidy up the units to be packed, and applies sufficient pressure to form the items into a solid charge. This pressure is carefully calculated, and is adjustable to suit the requirements of the product concerned.

At this stage the main ram pushes the charge into the sack, the length of the stroke being calculated so that the movement is sufficient also to discharge the filled container from the sack jaws. The sack is delivered into an upright position for sealing, and the hopper cover automatically returns to the open position in readiness to commence the cycle again.

The hand-operated baling unit, built to fulfil a demand existing where space is restricted and output is low, provides a hand-assisted aid for filling multiwall baler bags. It comprises a sack holder mounted on a framework, the working height of which can be adjusted. The sack holder performs the dual function of holding the sack and guiding the product into the baler bag.

New Web Processing Combination

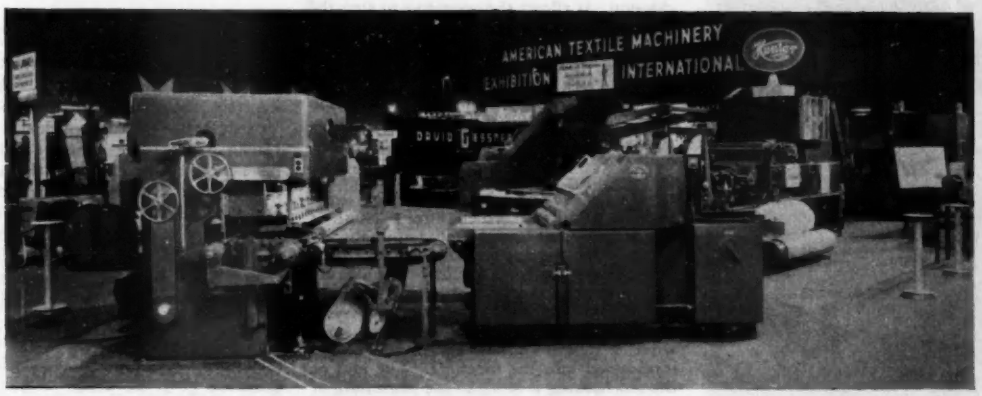
KEEN interest was displayed by representatives in the non-woven textile manufacturing field who visited the A.T.M.A. international exhibition recently held at Atlantic City in an equipment combination manufactured by James Hunter Machine Co., North Adams, Massachusetts. One unit, the Fibre/Locker needle felting machine, is already widely used in the industry but the other unit, the Webformer, was on view for the first time. This machine, designed either for direct feed from the lapper, or equipped with a special creel for remote operation with laps, produces a random construction of improved multi-directional strength from animal, vegetable and synthetic fibres. Adaptable to all constructions, from gauze weight up to 4 ins. in thickness, it is reported to improve the uniformity of fibre distribution and eliminate lap joints.

Simplified design of the equipment reduces maintenance problems and the need for close tolerances in adjustment. Positive air doffing of the cylinder prevents overworking and possible damage to the fibre, so that maximum web production is obtained at any given operating speed. Further provision is made for preserving web quality by the use of positive-grip feed rolls to prevent the defects that result from plucking. Static accumulation in the web is effectively reduced by an open air circulation system that utilises ambient room air; internal humidifying devices are not required. The Webformer can be supplied in widths from 40 ins. upwards.

During the exhibition (as shown in the photograph) the random web produced by the Webformer was transported directly to the company's Model 9 Fibre/Locker needle felting machine. This high-speed non-woven felt production unit is specially counter-balanced for smooth, vibration-free operation and can be installed on any standard mill construction floor without the need for special pedestals or base plates, etc.

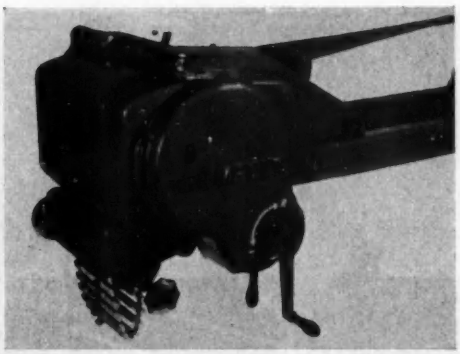
The needleboard, made of selected mahogany for grain uniformity and dimensional stability, can be supplied in several different scientifically-designed patterns. The "Scatter" pattern permits progressive filling-in of the punch pattern, and prevents ridging and furrowing, which can have adverse effects on the appearance and uniform density of the felt. Jig-drilled steel stripper and bed plates, perforated with holes for each individual needle, provide uniformly stable support of the fibre batt, to enhance the dimensional uniformity and durability of the product being felted.

Designed with extreme compactness, the Fibre/Locker occupies only 2 ft. more floor space than its rated width, and extends only 4 ft. deep. The Model 9 is available in 45 and 65 ins. widths. A larger machine, the Model 8, providing the same general vibration-free design and operational features, is available in 90, 105, 132¼ and 160 ins. widths.



The Hunter "Fibre/Locker" and Webformer

Modern Dobbies and Undermotions



The Trumpet dobby

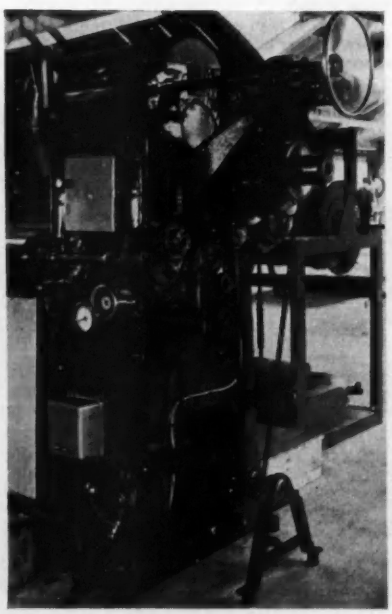
WIDELY adopted in Europe and claimed to be standard fittings on many European looms the well-known double-lift eccentric pattern dobbies made by Erich Trumpelt, Bayreuth, W. Germany, are now available from Irvin Hudson Ltd., Ingleby Street Works, Bradford 8, sole agents in Gt. Britain and Ireland. Incorporating a number of features, stated to make them ideal for modern high-speed conditions, these dobbies are available as a totally enclosed construction which prevents damage to the fabric from falling oil and, at the same time, excludes dirt from the mechanism. The casing is easy to remove for maintenance although, with self-lubricating bearings on all shafts, maintenance is negligible.

The dobby is a double-lift mechanism with two knives driven by two eccentrics. The knives are fitted with ball-bearing mounted bowls running on the face of the eccentrics and movement is at a minimum. The knife drive has only four joints. The mechanism is capable of operating smoothly and quietly at high speeds and a hand pickfinder with patent engagement can be fitted. Either paper card or wood lag selection is available with a special safety mechanism to prevent damage to the cards.

The shafts are controlled overhead either by toothed levers or by rollers with self-lubricating bearings to eliminate oil drip wear and tear. Either system gives a level and even lift to the shafts and the depth of the shed can easily be increased for the rear shafts. Very little light is excluded from the fabric particularly in the case of the roller top since very thin cords are used to suspend the shafts which cannot stretch. Trumpelt dobbies are available for all superstructure looms, also for automatic looms without superstructure. They are normally made in 12, 16, 20 and 25 shafts with 12 mm. spacing and can be used for all types of cloth.

The shafts are controlled beneath the loom by special spring-operated undermotions which hold the shafts perfectly rigid whilst down. The pressure eases off as the shaft is lifted to reduce strain and allow an easy action throughout the shedding operation. There are nine easily adjustable variations of strength to suit every case. The undermotions are also available with totally-enclosed construction to prevent dirt and "fly" penetrating the mechanism and causing wear and tear. Dirt collecting on the surface of the casing is easily wiped-off during loom-cleaning. Self-lubricating bearings are available and the undermotions can be had with any number of shafts up to 25 in 12 mm. spacing. These undermotions, it is pointed out, can be used to advantage with any type of dobby.

New Header Motion for Rugs and Carpets



MANY modern rugs are manufactured with an area of tufting surrounded by a section of plain hessian. This hessian is then folded round and a filling inserted in the rug, this being protected by a special backing cloth which is then stitched over the entire back of the rug. British Tufting Machinery Ltd., Whitebirk Drive, Blackburn, Lancs., have now introduced a special new header motion particularly useful for this type of production. It allows the operative to stop the machine, cut off any remaining loops on the loopers and then, disengage the machine—with the needles in the "up" position—while feeding through the backing cloth. In this way an untufted section of hessian is passed through the machine.

The mechanism is extremely simple, consisting of an electro-pneumatic clutch and an individual electric motor drive for the carpet backing. A measuring device is coupled to the unit which, after a length of rug material has been tufted, automatically cuts out the machine. The operative then "rocks" the machine to cut off remaining tufts and then feeds the backing through.

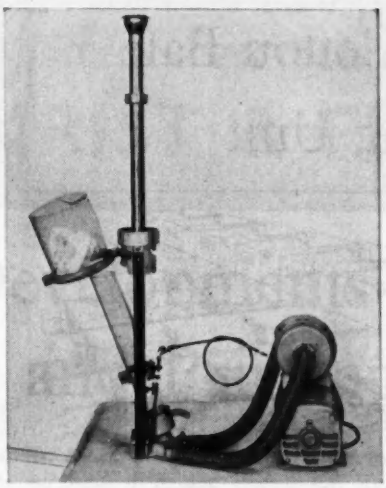
The same motion can be fitted to broad-loom machines as it is particularly useful when a length of new backing is to be introduced into the machine. The end of the old backing is sewn to the beginning of the new and this is then fed through the machine *without* being tufted. This reduces waste and gives the tufted carpet manufacturers a decent length of backing to handle before the tufting begins. All existing tufting machines built by B.T.M. can be fitted with this simple mechanism which is a substantial aid to improved efficiency on both rug and yardage machines.

• • •

Geigy Remove to Heald Green

Geigy Co. Ltd., Rhodes, Middleton, Manchester, has acquired, subject to contract, the offices and laboratories of the British Rayon Research Association, Heald Green, Manchester. The site and buildings have become available since the Association is to merge with the British Cotton Industry Research Association at Didsbury. The Geigy Co. Ltd. is a member of the group which in Britain, under Geigy (Holdings) Ltd., also includes the Geigy Pharmaceutical Co. Ltd., Wythenshawe, Ashburton Chemical Works Ltd., Trafford Park, and James Anderson and Co. (Colours) Ltd., Paisley. The group is an associate of J. R. Geigy S.A., of Basle, which has been continuously active in the chemical industry since 1758.

The vacuum take-down tube in the 1st or knitting position



The vacuum take-down tube in the 3rd position having just completed the ejection process

New Monotube Suction Take-Down Unit

AN effective and simple approach to the growing popularity of suction take-down in the production of circular hose, a new unit recently introduced by Lodge and Wallis, Kate Street, Leicester, has already aroused considerable interest. Powered by a ¼ h.p. motor operating a fan unit, a current of air is drawn down a single Perspex tube positioned under the machine chute. The suction is effective after comparatively few welt courses and is claimed to remain constant throughout the knitting cycle. Just prior to casting off, the Perspex tube, which is pivoted, is caused to tilt slightly away from the chute thus breaking the air seal and neutralising the flow of air so that unroving is prevented during casting-off. The tube is then immediately brought back to its original position, the hose is cast-off and drawn to the bottom of the tube.

At this point the tube is once more caused to tilt but this time to a greater angle so that its top is completely away from the chute and so that its base grill is brought over the exhaust side of the fan unit instead of the intake. The result is that the hose is blown out of the tube where it is caught either in a container or, preferably, on the rim of a plastic-covered metal ring. As soon as the finished hose has been ejected the tube immediately returns to knitting position.

The cycle of operations is actuated by a lever operating from cams on the speed-change drum, the lever transmitting the cam action to the tube by Bowden cable. Like the action of the unit, the fitting of it is simplicity itself. A brass tube is placed inside the chute with its bell-mouthed top close up to the needles. It is then located centrally by an adjustable collar screwed through the chute casing. The tube housing is then secured to the bottom of the base tube and itself secured inside the chute by an adjustable split collar. The cams are fitted to the speed change drum and the actuating lever mounting screwed to the main casting of the machine. Fitting takes about an hour.

In addition to simplicity, ease of maintenance and the short broken down period for fitting, there are other advantages. Machines take up no more room when fitted with the unit than without it. The fact that there is a two-way movement of air within the Perspex tube means it is being continuously and effectively cleaned. This applies particularly to the grill in the bottom of the tube where single direction air-flow tends to collect foreign matter and possibly to render the suction less efficient. The grill itself is ingeniously ball-bearing mounted so that it rotates in sympathy with the hose, resulting in larger sizes becoming less twisted than normal. All enquiries regarding the "Monotube" should be addressed to Kilbourn Martin Ltd., Sanvey Gate, Leicester.

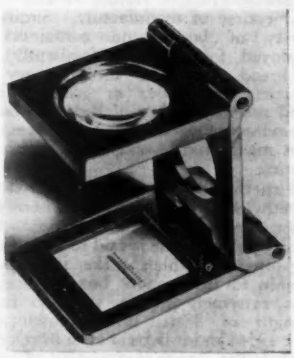
Precision Pocket Graticule and Magnifier

A POCKET magnifier with built-in graticule that folds into a neat square measuring only 2½ by 1 7/16 by 9/16 in., and can be comfortably carried in the waistcoat or breast pocket has been introduced by Graticules Ltd., Bath House, 57-60 Holborn Viaduct, London, E.C.1. It has been designed, amongst other requirements, to fill the gap between rough estimation with a scale and precise measurement with elaborate and expensive instruments and will be found to have an almost universal use in factories of all kinds, engineering and metallurgy, textiles, laboratories, technical colleges and universities, etc., graticule patterns being available to meet individual requirements.

Although the makers claim to be amongst the oldest and most experienced makers of graticules in the world, it is only recently that a chain of circumstantial requirements has led them to the design and production of this handy, inexpensive little measuring instrument, the use of which, with the requisite graticule patterns, has such wide applications.

As will be seen by the illustration, the micrometer, which is on glass, is mounted in the base of a low-powered folding magnifier, the whole frame being made of aluminium, cut away to give maximum visibility, the field of view being 1 in. square. The micrometer scale, when used, is placed in close contact with the object to be measured or viewed and the scale shows up well against a wide variety of colours, whilst the graduations are sufficiently fine to ensure a reading accuracy of ± ·002 in.

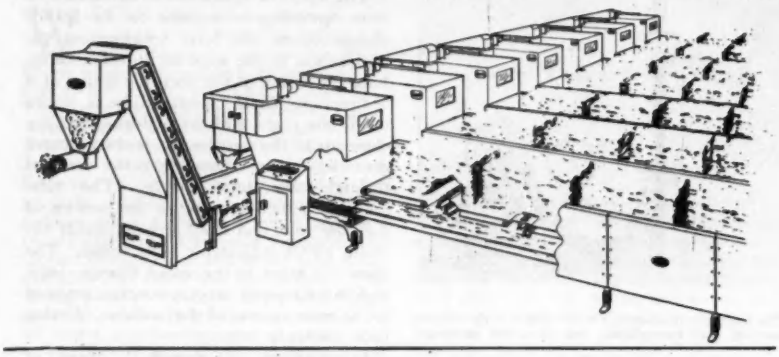
Graticules Ltd. in the production of their scales, recently evolved what they call their maXta process which, it is said, gives an ideal surface image firmly bonded to the glass and resistant to heat, chemical attack and abrasion to the same extent as to the glass itself.



The maXta pocket magnifier with graticule

The process is an economical one, the cost of the graticule itself being only 30s.; thus, replacement in the event of breakage, is reasonable. Cost for the complete magnifier and graticule, which includes postage and packing, is 80s. A wide variety of patterns is available.

Automated Cotton Bale Blending Unit



Hunter multi-tuft bale blender feeding fibre meter automatic blending system

THE new multi-tuft bale blender shown at the recent A.T.M.A. International Exhibition at Atlantic City by James Hunter, Incorporated the southern subsidiary of James Hunter Machine Co., North Adams, Mass., is designed to bring automated precision to the opening room, and to eliminate haphazard mixing and assure greater blend uniformity. This unit—the Model AN blender—picks predetermined amounts from each bale in the mix. Dependence on unskilled opening room personnel is eliminated. Bales are carried on a conveyor to the automatic picker fingers, which effectively pre-open the fibres prior to blending and subsequent processing. Amounts are removed alternately from each bale in a grade, so that the possibility of short-term variation between bales is eliminated.

When set up to precede the company's fibre meter automatic cotton blending system, the multi-tuft bale blender is claimed to provide the ultimate in blend control and assures a resulting improvement in fibre uniformity and yarn quality. Fibre meter systems, already in use in mills throughout the world, maintain blend accuracy with, it is said, a tolerance of $\pm 1\%$. The makers point out that the new device introduces a degree of control which hitherto has been only theoretical, since it is possible to automate the blending process from the crucial opening of the bales. The control exercised by the multi-tuft blender assures continuous repetition of blend accuracy, and simple duplication of blend quality at a later date.

Tote Boxes for Trade and Industry

Tote boxes made from Rigidex high density polythene are useful for handling a wide range of materials

MANY industries—and particularly the textile trades—use lidless trays or boxes of standard dimensions for transporting or storing articles during their course of manufacture. Similarly a variety of boxes and containers are employed for handling foodstuffs such as bread, fish and confectionery raw materials in powder or granular form. Until recently, many of these containers, commonly referred to as tote boxes, have been made from wood, light metals and plastics.

With the introduction of high density polyethylene fresh impetus has been given to the use of plastics in this field. High density polyethylene is said to offer a range of properties which make it especially suitable for many tote box applications. It is extremely strong, with an impact strength of 8 ft. lb./in. notch (B.S. 771 : 1954) and it is rigid even in relatively thin sections Another important advantage is its lightness: having a density of 0·95 - 0·96 it is one of the lightest plastics materials and it thus possesses a high strength/weight ratio Tote boxes made from high density polyethylene are claimed to have good resistance to denting and cannot splinter or chip. They also have good abrasion resistance and are not readily stained or punctured.

British Resin Products Ltd., Devonshire House, Piccadilly, London, W 1, point out that the good temperature resistance of high density polyethylene is a further asset wherever tote boxes require to be sterilised at 100°C., as in certain processing operations. High density polyethylene also has excellent resistance to corrosion: it is proof against chemicals, oils and greases, and to most common solvents. High density polyethylene is said to absorb no moisture and impart no taste or odour Tote boxes made from it are quiet in use and pleasant to handle. They can be produced in a wide range of integral colours, thereby making it easy to identify particular products. At present tote boxes made from Rigidex high density polyethylene are being developed for use in a variety of industries.

* * *

Cotton Industry Act 1959

The Special Committee of the Cotton Board announces that the Cotton Finishing (Woven Cloth) Reorganisation Scheme and the Cotton Finishing (Yarn Processing) Reorganisation Scheme, approved by Parliament and confirmed by the Board of Trade, came into operation August 1, 1960. Application forms are available from The Cotton Board, Royal Exchange, Manchester 2, The Textile Finishing Trades Association, 16 St. Mary's Parsonage, Manchester 3, and The Employers' Federation of Cotton Yarn Bleachers, Dyers and Sizes, 2 Cooper Street, Manchester 2.

* * *

Export Opportunity

Archipelago Traders Co., 3rd Floor, Nunes Building, Malacca Street, Singapore 1, want to contact some leading U.K. manufacturers of mohair and woollen piece-goods. Pointing out that they have many years' experience as manufacturers' representatives, importers and exporters, the company state they have built up wide connections in these cloths.

THE TEXTILE
COLOURIST & FINISHER

Recent Developments in Dyeing and Printing

A review of some recent improvements in level-dyeing agents, reducing agents, methods of dyeing polyamide and polyester goods and mixtures, pressure dyeing techniques with synthetic fabrics, and padding methods

By B. C. M. DORSET

IN dyeing sulphur and particularly vat dyes on cotton and other cellulose fibre materials it is sometimes difficult to ensure that level shades are produced. Various substances can, however, be added to the dyebath to aid level dyeing but these usually act by restraining absorption of the dye and thus making the process less efficient from a tinctorial viewpoint. A simple substance such as glue can much assist the level absorption of a vat dye but it will require the application of a higher proportion of dye to give the shade than when no glue is used. A large number of highly complex organic compounds can be used instead of glue and these include highly sulphonated ricinoleic acid (Calsolene Oil HS of I.C.I.) and isopropylnaphthalene sulphonic acid (Nekal B of I.G.) but if used in the vat dyebath in relatively high concentration they can almost completely prevent dyeing.

An assistant based on a lactam type of structure such as polyvinyl pyrrolidone (Peregal ST or Albigen A) has the formula given in Fig. 1 which

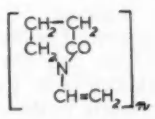


Fig. 1

reveals the nature of its five-membered lactam ring structure containing the essential group —NH— CO— —has in recent years proved very useful for promoting level vat dyeing. It restrains dye absorption to allow a slower dye take-up and if used in higher concentration it can also be used for stripping vat dyed materials. Apparently such a lactam compound loosely combines with the vat dye in its leuco form and thus prevents or hinders its absorption by the cellulose fibres. Although level dyeing is thus assisted it is a disadvantage that the dyeing process is retarded in this manner. Hence the value of a recent German discovery (B.P. 834,393) that a number of compounds containing at least two lactam ring structures (they may be 5- or 7-membered rings) are not only efficient as regards their levelling action but that they have but a very small dye restraining action—it seems that because there are a plurality of lactam groupings within the same molecule these advantages are obtainable.

Quite a number of these new levelling agents can be prepared and they all conform to the general formula set out in Fig. 2, in which *L* represents the same or different lactam radicals derived from butyrolactam (pyrrolidone), valerolactam, or caprolactam, R^1 represents a chain of 2 to 6 carbon atoms in length, R^2 represents a chain of 1 to 6 carbon atoms in length, R^3 represents a chain of 2 to 6 carbon atoms in length, *n* represents 0, 1, 2, —— 20 or even more, and *X* represents an atomic grouping selected from, —NH—, —NR^4—, —O—, or

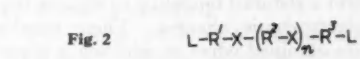


Fig. 2

—S—, in which R^4 is an aliphatic radical of 1 to 5 carbon atoms in length. More broadly described, the new levelling agents are substances whose molecules are built up of two or more lactam groupings separated by relatively short carbon chains in which are the interrupting groups as mentioned above and containing N, O, or S atoms. Thus a preferred type of agent is one conforming to such formulae given in Fig. 3 in which *L* represents a lactam grouping so that *L*

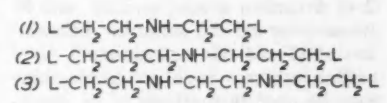


Fig. 3

may represent butyrolactam, vero lactam, or caprolactam ring structures having the formulae given in Fig. 4.

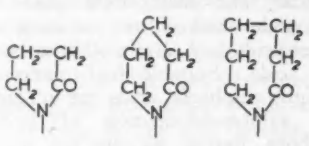


Fig. 4

A B C

A—Butyrolactam C—Caprolactam
B—Valerolactam

One of these assistants having excellent vat dye levelling properties is made by reacting one mole of triethylene tetramine with two moles

of butyrolactone and has the formula shown in Fig. 5. These assistants are generally suitable for all the dyeing methods which are employed for the application of vat (also sulphur) dyes. Cotton yarns in package form such as

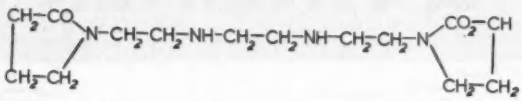


Fig. 5

cheeses, beams, cakes, etc., can be more levelly dyed when such assistants are used.

Level-Dyeing Agent for Acrylic Goods

According to B.P. 832,444 German research has indicated that in dyeing acrylic fibres containing a high proportion of acrylonitrile it is now possible not only to secure level dyeing when applying basic or disperse dyes but also to ensure that the dyed material has outstanding softness and a reduced tendency to accumulate electro-static charges. These results are obtained when an addition is made to the dyebath of an amidoamine of general formula shown in Fig. 6,

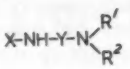


Fig. 6

in which *X* is the acyl residue of a high molecular weight carboxylic or sulphonic acid containing a straight or branched, saturated or unsaturated, chain of 10 to 18 carbon atoms (this chain can be interrupted by hetero atoms), *Y* is an alkylene radical of 2 to 6 carbon atoms, and R^1 and R^2 (these may be the same or different) are alkyl radicals containing 1 to 4 carbon atoms. Such an amidoamine may be used in the form of its water-soluble salt or as a quaternary derivative.

Examples of suitable carboxylic acids are lauric, myristic, palmitic, stearic, and oleic acids (also the sarcosides derived from sarcosine and these acids) and certain other carboxylic acids. Suitable high molecular weight sulphonic acids are obtained by sulpho-chlorination of hydrocarbons having an average of 15 carbon atoms and thereafter saponifying. Such amidoamines can generally be made by heating the carboxylic acid in equi-molecular ratio at 140 to 180°C. with a diamine or by reacting with the diamine a sulphonic acid chloride.

In applying a basic dye to Orlon knitted fabric the dyebath is prepared with the dye, 0·5 grams of glacial acetic acid, 0·5 grams of sodium acetate and 0·5 grams of the amidoamine 1—stearylamide—3—dimethylamino—propane acetate per litre and dyeing is commenced at 40°C. Thereafter the temperature is slowly raised to 98°C. and dyeing is continued at this temperature for one hour. A full shade is thus obtained with the dyed Orlon left soft and less liable to accumulate electrostatic charges. The amidoamine used is made by adding dimethylamine to acrylonitrile to secure additive combination, then reducing the nitrile group and further heating one mole of the resulting 3—dimethylamino—1—propylamine with one mole of stearic acid at 18°C. for three hours and subsequently neutralising with acetic acid. It has the formula given in Fig. 7.

Sulphinic Acid Reducing Agents

Some 10 years ago thiourea dioxide (formamidinesulphinic acid) was introduced to textile printers as a reducing agent for vat dyes and alternative to the much used sodium formaldehyde-sulphoxylate. It is now available under the trade name of 'Manofast' (Hardman and Holden Ltd.). As a reducing agent it is just as powerful as the formaldehyde-sulphoxylate but whereas this substance exerts its reducing action most satisfactorily (in printing) under alkaline conditions the thiourea dioxide is best used under acid conditions. Since acetate fibre fabrics undergo undesirable saponification when printed with vat dyes using the normal alkaline printing pastes employed for these dyes it is obvious that thiourea dioxide can be very useful to avoid this saponification since it is effective under acid conditions.

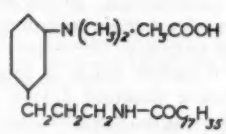


Fig. 7
1 — Stearylamido — 3 — dimethylamino — propane acetate

Experience with thiourea dioxide has shown that it can be used satisfactorily for the printing of acetate fibre fabrics with vat dyes without causing saponification of the fibres, but on the other hand these same conditions of printing do not allow the simultaneous printing of vat dyes on cellulose fibres—the acid or non-alkaline conditions are not favourable to absorption of the vat dye by cellulose fibres although they are to acetate fibres and indeed to other fibres such as those of the polyamide and polyester types. If it is required to print vat dyes simultaneously on acetate and cotton fibres using thiourea dioxide as the reducing agent then it is necessary to have present in the printing paste a mixture of ordinary vat dyes and vat dyes in their solubilised forms (sulphuric acid esters of leuco vat dyes which are now available as Soledon and Indigosol types). Under such conditions the ordinary vat dye is absorbed by the acetate fibres while the solubilised vat dye is absorbed by the cotton—it is thus possible to produce solid or two-colour effects.

Recently it has been discovered (B.P. 829,936) how to modify this method of printing vat dyes so that a wide range of different fibres including acetate, cotton, viscose rayon, wool, and synthetic fibres can all be dyed without the necessity for employing the solubilised type of vat dye. The new printing method is based essentially on having as a reducing agent in the printing paste not thiourea dioxide but a related hydroxyalkyl sulphinic acid and also a suitable organic amine compound chosen from a wide range of amines which have been found suitable. It would appear that the combination of an amine as for example ethylene diamine or dodecylamine with an hydroxyalkyl sulphinic acid such as hydroxymethane or hydroxyethane or hydroxybutane sulphinic acid (in the form of its water-insoluble or sparingly soluble salt) has greater stability towards undesirable atmospheric oxidation than has thiourea dioxide and thus it becomes possible to avoid certain difficulties associated with the use of this last named reducing substance.

A particularly useful reducing composition of the type described above consists of triethanolamine and zinc hydroxymethane sulphinate and its action in a vat dye printing paste is much improved if there is also present polyethylene glycol. The following example illustrates how this use of the mixture of amine and sparingly

soluble zinc hydroxymethane sulphinate can be used for the discharge printing of ordinary acetate fabric.

Firstly the acetate fabric is dyed red with the disperse dye which results from the coupling of diazotised para-nitroaminobenzene with dihydroxy-ethylamino-meta-methylbenzene. It is then overprinted with the discharge paste in Table I.

Table 1

	Parts
5 : 5¹-dichloro-7 : 7¹-dibromoindigo, 20% paste	100
Benzyl sulphanilic acid sodium salt	30
The secondary zinc salt of hydroxymethane sulphinic acid	100
Polyethylene glycol	60
Cyclohexylamine	50
33% crystal gum thickening	500
Water	100
	1,000

The fabric is then dried and steamed for 10 mins. Development of the vat dye is promoted by treating the fabric in an oxidising bath at 50°C. for about 20 mins. and which contains per 1,000 parts about two parts of ammonia and three parts of hydrogen peroxide. The fabric is finally soaped at 50°C. so that a blue pattern is obtained on a red ground.

A blue pattern is obtained on a white cotton fabric by a similar discharge printing process in which the printing paste in Table 2 is employed:

Table 2

	Parts
5 : 5¹-dichloro-7 : 7¹-dibromoindigo, 20% paste	100
Barium salt of hydroxymethane sulphinic acid	100
Polyethylene glycol	60
Triethanolamine	50
33% crystal gum thickening	500
Sodium salt of benzylsulphanilic acid	30
Water	160
	1,000

Similar printing processes may be used for the vat dye printing of cellulose triacetate, wool, viscose rayon, "Terylene" and nylon fabrics and in all such printing a high colour yield is obtained from the vat dye applied while no saponification of the acetate fibre material is produced.

Dyeing Polyamide and Polyester Goods

The hydrophobic character of nylon and "Terylene" fibres which is responsible for their reluctance to absorb dyes can be overcome by having present in the dyebath a so-called dye-carrier. Such a dyeing assistant often acts by slightly swelling the fibres so that dye penetration is thus considerably facilitated. Many potential dye-carriers are available but only those should be used which have no adverse effect upon the fastness of the resulting dyeing—many have thus to be rejected. Recently it has been recommended (B.P. 831,141) to use cyclohexylamides of sulphonic acids of the benzene series as dye-carriers and specially suitable among these are benzene sulphonic acid cyclohexylamide and the ortho-, meta-, and para-toluene sulphonic acid cyclohexylamides. It is advised to use from 0·2 to 3·5% of such a dyeing assistant calculated on the weight of synthetic fibre being dyed and according to the fibre/liquor ratio of 1/20 to 1/50 being used for the dyebath. Under such conditions nylon should be dyed at 65 to 80°C. while "Terylene" will be dyed at the boil.

Table 3 clearly shows how effective these cyclohexylamides can be. They

Table 3
Dyeing Nylon

Dyestuff	% of Cyclohexyl-amide on fabric	% Dye absorbed in 15 min.	30 min.	60 min.
Dispersal Fast Yellow G.300	0	38	65	76
	2·5	45	75	85
Dispersal Fast Red R.300	0	27	50	63
	2·5	74	80	86
Duranol Brilliant Blue G.300	0	28	44	53
	2·5	50	67	70

Dyeing "Terylene"

Dyestuff	% of Cyclohexyl-amide on fabric	% Dye absorbed in 15 min.	30 min.	60 min.
Dispersal Fast Yellow G.300	0	20	27	29
	2·5	20	40	55
Duranol Brilliant Blue G.300	0	30	40	40
	2·5	50	64	80

are based on measurement of the dye absorbed during the dyeing of nylon and "Terylene" materials with and without the presence of para-toluene sulphonic acid cyclohexylamide to dyebaths also containing 1 millilitre of triethanolamine dodecyl sulphate per litre. In each case the ratio of fibre/liquor was 1/50 and the dyeing temperature for nylon was 80°C. and for "Terylene" 100°C.

Fast Shades on Polyester Cotton Mixtures

A very interesting article by Iannarone and Wygand (Amer. Dye. Rep., 1960, **49**, 81 *P*) deals with the dyeing in fast shades (selected disperse and vat dyes are employed) of fabrics containing 65% "Dacron-54" and 35% of cotton and it is obvious that most of the experience described applies equally well to those fabrics which contain "Terylene" instead of "Dacron-54" since both of these polyester fibres consist of polyethylene terephthalate.

Some seven years ago a so-called Thermosol process was introduced by Gibson (U.S.P. 2.663,612) for dyeing "Dacron" fabric in open width and since then it has been developed by the du Pont Co. with considerable success. The process essentially consists of three stages—padding the fabric with a dye liquor, drying and stentering to a uniform width slightly exceeding that ultimately required, and running the dry fabric through a chamber where it is exposed to a temperature of 400 to 425°F. for a period of about 1 min. to effect dye fixation (heat setting of the fabric takes place simultaneously). This dyeing process can be carried out at 60 to 80 yds./min. and the heating chamber can be of the type commonly used for curing resin-finished fabrics in producing crease-resist finishes. An important feature of the Thermosol process is that it does not require the use of dye-carriers to promote dye fixation—the high temperature of heating of the dye-padded fabric ensures that usually 75 to 90% of the colour value of the applied dyes is utilised. By avoiding the use of dye-carriers the various problems associated with their use, e.g., risk of impairing the fastness of the resulting shade, relatively high cost and their weakening effect on the fibres being dyed, can be obviated.

The exact method of using this Thermosol process depends on the depth of shade. From considerable large scale experience Iannarone and Wygand are now able to advise the most appropriate methods to meet different requirements. For dyeing pastel shades it is satisfactory to dye only the "Dacron" and use disperse dyes for this purpose. For dyeing even paler shades the alternative method of dyeing only the cotton (a pad-steam method gives good results) has been used with success. But in producing medium-to-heavy shades it is definitely necessary to dye both fibres and generally this is best effected (using the Thermosol process) with disperse dyes for the "Dacron" and vat dyes for the cotton. Here there is a choice between applying both types of dyes simultaneously or of applying first the disperse dyes to the "Dacron" by the Thermosol method and then separately applying by a batch-dyeing process the vat dyes to the cotton; by the latter method it is more difficult to control the ultimate shade but it has the advantage of allowing dye fixation on both fibres to be effected in one run through the heating chamber.

Before dyeing it is important to prepare thoroughly the cotton-"Dacron" fabric to ensure the dye liquor being evenly distributed in the padding process. The following preparatory treatment is recommended.

(1) Desize with an enzyme product. Often but little or no starch sizing is used for "Dacron" and cotton yarns so this operation may be omitted when appropriate especially since a later mercerising treatment can remove waxy impurities from the cotton.
(2) Scour in rope or open width form; the latter is preferred for fabrics liable to develop permanent creases or frays. The scouring liquor should contain a wetting agent and 4% of soda ash (or 2% of caustic soda).
(3) Mercerise.
(4) Wash and dry.
(5) Singe. It is to be noted that this operation for reducing the hairy surface of the fabric can be done previous to dyeing when the Thermosol dyeing process is used. In singeing there is risk that the fibre ends protruding from the fabric surface melt into small balls which become fused to the fabric surface—the melt balls dye deeper than the remainder of the fabric so that by ordinary dyeing methods the fabric is liable to show deep colour specks. By the Thermosol dyeing method such colour specks show much less prominently. Also in singeing any uneven heating of the fabric (such heating reduces the affinity of the fabric for dyes) is liable to show up as patchy dyeing except when the Thermosol method is used—the application of the dye by padding ensures a more even distribution of dye.
(6) Open-width bleaching if necessary.
(7) Stenter to grey width or slightly more if possible to counteract the width shrinkage which can occur in the passage of the fabric through the hot chamber for dye fixation.

The dye-padding liquor must be carefully prepared so that the dye is evenly distributed to avoid specking of the fabric. Generally it is advised to prepare it with water at 190 to 200°F. and after stirring in the dye to pass the liquor through a colloid dispersing machine. Thereafter an addition of 0·15 oz./gall. should be made of an alginate thickener since this improves the amount and uniformity of liquor pick-up in the padding operation. It also reduces dye migration during the drying of the padded fabric. The further addition of 0·2 oz./gall. of a wetting agent such as the sodium salt of a benzene or naphthalene sulphonate is useful.

Drying the padded fabric demands care since disperse and vat dye pigments have a tendency to migrate in the fabric according as the drying is even or uneven. Some advantage is obtained by partially pre-drying the fabric by radiant heat; uneven migration in this and the next stage of fully drying can be reduced. But with the presence of the alginate thickener and with as little wetting agent as possible, even drying without appreciable dye migration can be secured using ordinary drying apparatus. It is important to ensure that the back of the fabric is as intensively dried as the face-side say at 250 to 300°F. Otherwise the two sides may dye to different depths of shade. Iannarone and Wygand list many disperse and vat dyes which have been found satisfactory for use in dyeing "Dacron"-cotton fabrics by the Thermosol process as described above.

An important feature of the Thermosol method of dyeing fabrics containing polyester ("Dacron" and "Terylene") materials with disperse dyes is that in the short period of dyeing (say 1 min.) the dye becomes uniformly distributed throughout the fibre substance. Cross-sections of polyester fibres thus dyed have shown that within 20 secs. the distribution of dye without the fibre is about as good as that obtained by ordinary dyeing methods occupying say 60 mins. Within 30 secs. the distribution of dye is quite good while within 60 secs. at a dyeing temperature of 400°C. it is excellent. As is well known, the better is the dye distributed within a fibre the higher is the fastness of the colouring to light and washing.

Pressure Dyeing Synthetic Fibre Fabrics

It will be remembered that some seven years ago the du Pont Co. devised a special Barator dyeing machine for dyeing synthetic fibre fabrics in open width—it appeared to be based (Cole; Amer. Dye Rep., 1953, **42,** 32) on the constructional features of a Klauder-Weldon yarn dyeing machine. From a recent publication by Newcomb and Ward (Amer. Dye. Rep., 1960, **49,** 86 *P*) it would seem that practical difficulties encountered have now led to its supersedure by a beam-type dyeing machine primarily devised for the dyeing of ordinary acetate and cellulose triacetate fabric but which is now also proving satisfactory for the dyeing of polyester fibre fabric.

Beam-type dyeing machines in which the fabric, wound around a large diameter perforated cylinder to the extent of several superimposed layers is subjected to an in-outwards or out-inwards flow of dye liquor, have been occasionally used over many years but with only a moderate degree of success. The machine now perfected by technicians of the Gaston County Dyeing Machine Co. and the Celanese Corporation of America is reported to owe its success largely to special details of construction associated with the dimensions of the perforated beam and the arrangements for governing the dye liquor flow in either direction through the layers of fabric being dyed.

Previous dyeing machines have used beams of relatively small diameter and in some machines, notably the Bellmann machine (U.S.P. 2,872,802) the dyeing machine comprises a group of three to six such beams within each dyeing machine. It is now found much better to use one large diameter beam of say up to 4 ft. dia. capable of holding 3,500 yds. of fabric—this compares with but 300 yds. which can be dyed each time in other machines.

In the new machine the perforated beam is held in a horizontal position within an outer container (kier) containing the dye liquor which can be circulated through the fabric on the beam in either direction as desired. As this dye liquor flows around a closed circuit it passes through a heat exchanger by which it can be automatically maintained at any temperature within 1°F. Further, the dye liquor is forced through the fabric at a uniform pre-set pressure—the pressure and liquor flow can be controlled to suit the amount of fabric being dyed and its nature. Arrangements are provided so that the flow control valve is always closed when the liquor pump is not running and also during the time that this flow is being reversed. The valve opens slowly so that circulation of the dye liquor always commences slowly to avoid sudden development of liquor pressure which may be capable of disturbing the fabric layers on the beam. While dyeing is taking place the beam of fabric revolves slowly and this promotes level dyeing and helps to dissipate air pockets which may form in the fabric layers.

In dyeing synthetic fibre fabrics in a machine of this kind it is important to realise the practical considerations involved. Fabrics with a high potential for shrinkage during wet processing should be boiled-off to allow much of this shrinkage to take place before being wound on the beam. Any length shrinkage of the fabric during

dyeing will lead to a high build-up of pressure between the fabric layers and have a retarding effect on dye liquor penetration and flow-through; corresponding width shrinkage can lead to partial uncovering of the extreme rows of perforations of the beam to allow irregular liquor flow. It is more satisfactory to run the fabric on to the beam via a short stenter which brings the fabric to a uniform width and facilitates an even positioning of the fabric selvedges. Experience has shown that this running-on of the fabric is easier if it is wet or damp. Further a length of cotton fabric should be wound on the beam to cover the perforations before running-on the fabric to be dyed. It is generally better for the fabric to overlap the outside perforations by 1½ to 2 ins. (2 to 3 ins. for knitted fabric).

The following considerations are worth while concerning the dyeing of different types of fabric.

Cellulose Triacetate Fabrics.—These respond very satisfactorily to this method of dyeing. Normally dyeing is not carried out above 220°F. since many of the disperse dyes employed for this type of fibre break down at higher temperatures. However, if the dyeing temperature is held at 250°F. for 30 to 45 mins. the dyed fabric becomes completely heat-set so as to possess wash-and-wear characteristics.

Nylon/Polyester Mixture Fabrics.—These can be dyed by either a one- or a two-stage process in which the polyester fibres are dyed with disperse dyes while the nylon is shaded to match the desired colour by the use of acid dyes. Dyeing is usually conducted at 230°F.

Polyester/Wool Mixture Fabrics.—These are dyed by a one-stage process for light and medium shades and by a two-stage process for heavy shades. In the former case disperse dyes and neutral-dyeing acid dyes are applied simultaneously; in the latter case disperse dyes are applied to the polyester fibre and either level-dyeing chrome or neutral-dyeing pre-metallised acid dyes to the wool. In the dyeing of such mixture materials by ordinary methods it is usual to find that the wool picks up a considerable proportion of the disperse dye used for the polyester fibre—this is a nuisance since disperse dyes on wool give colourings which have but poor fastness to light. Fortunately, when the dyeing is effected in the beam-dyeing machine the polyester fibre absorbs a higher proportion of the disperse dye so that the wool is less stained with this dye. High dyeing temperatures, say above 230°F., tend to weaken the wool fibres.

Sheer 100% Polyester Filament Fabrics.—Cloths such as ninon and marquissette tend to shrink excessively and distort during high temperature wet processing so that these should be heat-set before dyeing in the beam-dyeing machine. Thereafter, they may be satisfactorily dyed at 230 to 240°F. with disperse dyes. It is generally advised to dye at as high a temperature as is practically possible since such conditions favour more rapid absorption of dye (especially by polyester and cellulose triacetate fibres) accompanied by more complete exhaustion of the dye liquor, a saving of as much as 50% in dyes and chemicals is possible. The superior dye penetration of the fibres leads to better fastness to rubbing, washing and sublimation, and no dye-carrier is required.

A possible defect of this method of dyeing is that with some cellulose triacetate fabrics the pressure of layer-upon-layer causes moireing—an irregular lustring which is often most undesirable. This defect can be obviated to some extent by pre-shrinking the fabric and by winding it on the beam with the least possible pressure. The type of beam-dyeing machine now being produced as described above is usually designed to allow a maximum dyeing temperature of 250°F. but this need not be the upper limit.

Padding With Esters of Leuco Vat Dyes

Although a general method for applying vat dyes to cellulose fibre fabrics involves preparation of a dye liquor in which the vat dye exists in the dissolved state such as can be secured by having alkali and a reducing agent (sodium hydrosulphite) present there is the alternative method not requiring the use of alkaline reducing conditions in which the vat dye is employed in the form of a water-soluble sodium salt of the sulphuric acid ester of the vat dye in its leuco state. The relation between the water-insoluble vat dye indigo and its corresponding water-soluble sulphuric ester is shown in Fig. 8.

These water-soluble esters of leuco vat dyes have only a moderate affinity for cellulose fibres so that they are often applied to say cotton and viscose rayon fabrics by a padding technique followed by acid oxidation to decompose the dye ester and leave deposited in the fabric the vat dye in its original insoluble form. A difficulty experienced in such a dyeing process is that although these solubilised vat dyes have only a moderate affinity for cellulose fibres they differ among themselves in their degree of affinity and so in the padding operation using a mixture of such dyes one dye may be substantively absorbed more than the others. Under such conditions the dye composition of the padding liquor may change as the padding operation continues and the fabric first padded may ultimately be found to have a different shade from the last portion of fabric—this gradual change of shade throughout the padding would not occur if all the dyes in the mixture had the same degree of substantivity for the textile material being padded.

Various expedients can be adopted to remedy the fault noted above. For

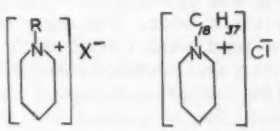


Fig. 9 Fig. 10

example, the volume of padding liquor can be kept very small so that it has very frequently to be replenished. Another method is to add periodically fresh padding liquor whose composition is adjusted to correct the changes of dye composition in the used padding liquor. But recently a simplified remedy has been discovered (B.P. 833,668). It consists of preparing the padding liquor with the addition of a quaternary compound conforming to the general formula set out in Fig. 9.

(*continued on page 375*)

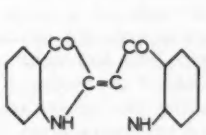


Fig. 8a Indigo (insoluble)

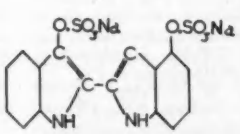


Fig. 8b, Di-sodium salt of the di-sulphuric acid ester of leuco indigo (water soluble)

Gripping High-Strength Fabrics During Tests

Details and test results of a method designed to overcome the problem of yarns slippage in fabrics when subjected to tests for tensile or bursting strength

By K. F. PLITT and L. A. DUNLAP

THE determination of physical properties of high-strength fabrics, such as tensile strength and burst strength, are complicated by the tendency for yarns to slip during testing. A method is described here for laminating the gripped area of the fabric with Saran film to overcome this difficulty.

The fabric tested was 2 by 2 basket-weave nylon material with 20 double yarns per in. in the filling and 21 double yarns per in. in the warp. It weighed 13 ozs. per sq. yd. and had been scoured at 100°C. and heat-treated at 121°C. The 2-mil thick Saran film used to impregnate the fabric was in the form of flat tubing about 8 in. wide. The other plastics films used were 1·5-mil thick polyethylene and uncoated cellophane.

The laminating technique was developed for a piercing test that is intended to simulate a condition that the fabric would encounter in use. The initial tests with nylon fabric were made according to a modification of the method described in Federal Specification CCC-T-191, Textile Test Methods, Method 5120. This consists of holding the specimen in a ring clamp of 1·750 ± 0·001 in. internal diameter and bursting the fabric with a spherical plunger at a crosshead speed of 12 ± 0·5 in. per min. These tests were made with a steel plunger with a hemispherical end of ½-in. dia. instead of the steel ball used in Federal Method 5120.

The results of these tests were erratic. Yarns pulled from the edges of the specimens, and in some cases the yarns were not broken but had slipped aside to permit passage of the plunger. It was evident that poor gripping of the fabric was responsible for the erratic results.

Various methods of gripping the specimens were investigated. The use of such gripping materials as rubber, sandpaper, and leather reduced the slippage but did not eliminate it.

Fig. 1. Laminating press

Attempts were made to reduce yarn slippage by coating the edges of the specimens with various adhesives and coatings. Adhesives had been used by Schiefer[1] as a technique in gripping textile fibres. Difficulty was encountered with adhesives and coatings in maintaining a uniform test area free of the bonding material. Stone[2] had developed a technique for gripping the ends of cordage fibres during tensile tests by laminating the fibre tips. This technique was successfully modified for holding nylon specimens during the piercing tests.

A laminating press, Fig. 1, was built to laminate the edges of the specimen without heating the central test area. This press was made of two similar 7 by 9 by 2 in. sheet-metal boxes in which heaters were mounted. The heaters were doughnut-shaped 330-w. heaters as used in heavy-duty electric hotplates. Temperatures of both top and bottom heaters were controlled by a gas-filled bulb thermoregulator mounted with its bulb against the back surface of the top platen. The platens of the press were smooth, ⅜-in. thick aluminium-alloy plates. These heavy plates were necessary to heat the specimen evenly. A 2¼-in. dia. hole was cut in each platen and numerous smaller holes in the sides of the sheet metal boxes to provide ventilation to the central test area of the specimen during lamination. Temperature measurements with a fine chromel-alumel thermocouple showed a temperature of 92°C. in the centre of the open test area while the platen temperature was 175°C. A small light was mounted under the hole in the bottom press section to facilitate centring the specimen. A weight produced a pressure of about 2 p.s.i. on the specimen.

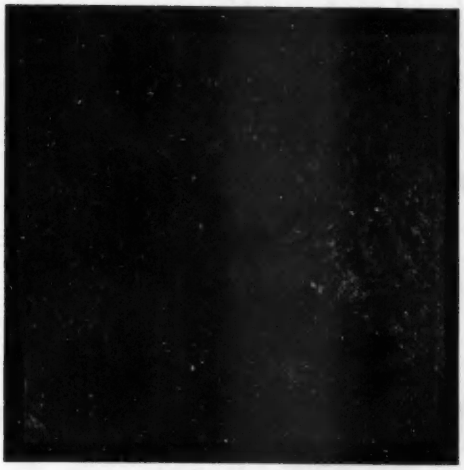
The optimum time and temperature for lamination were determined. Nylon fabric specimens were sandwiched between pieces of plastic film. Cello-

* *With acknowledgements to A.S.T.M. Bulletin, No. 246, May, 1960.*

Note—Discussion of this Paper is invited, either for publication or for the attention of the author or authors. Address all communications to A.S.T.M. Headquarters, 1916 Race Street, Philadelphia 3, Pa.

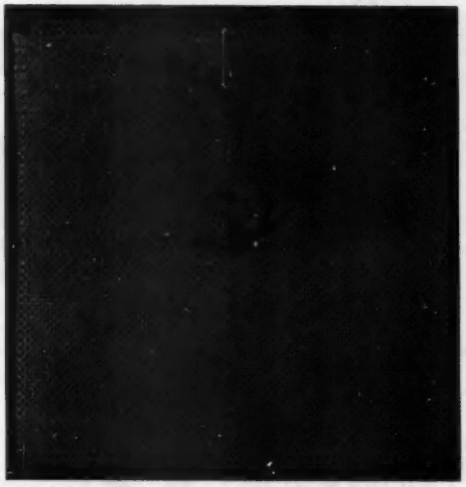
[1] *H. F. Schiefer, W. D. Appel, J. F. Krasny, and G. G. Richey, Impact Properties of Yarns Made from Different Fibres, "Textile Research Journal," Vol. XXIII, No. 7, July* 1953.

[2] *W. K. Stone, Textiles Section, Nat. Bureau of Standards, private communication.*



(left) Fig. 2. Laminated fabric after piercing test

(right) Fig. 3. Unlaminated fabric specimen after piercing test



phane film was placed on either side of the assembly during lamination to prevent adhesion to the press platens. The temperature was measured by a fine chromel-alumel thermocouple inserted in the assembly between the cellophane and other plastics layers. Specimens were laminated at platen temperatures of 175, 190, and 200°C. for 3, 4, and 5 min. Specimens laminated at 200°C. for either 4 or 5 min. performed equally well in the piercing test. A few specimens prepared at 210°C. became badly discoloured and were somewhat brittle after heating for 4 min.

Nylon laminates were made with 1·5 mil polyethylene and 2-mil Saran films. Tests with 20 specimens of each type of laminate gave piercing strengths of 549 lbs. for the nylon-polyethylene laminates and 655 lbs. for nylon-Saran laminates, with coefficients of variation of 5·3% and 5%, respectively. No slippage was observed in any of the specimens. Since the strengths obtained with Saran laminates were consistently higher and had a lower coefficient of variation than those obtained with polyethylene laminates, the Saran was considered the more desirable laminating material. Tests with several types of Saran film showed no significant differences in test data. A Saran film that does not shrink appreciably during lamination is easier to use than a high-shrinking type. Saran flat tubing is a convenient material to use in this application.

Figs. 2 and 3 show laminated and unlaminated specimens after the piercing test. The pulled and unbroken yarns visible in Fig. 2 are not present in the laminated specimen in Fig. 3.

Typical Test Results

A series of tests was made with Saran-laminated specimens to determine the effectiveness of this test procedure under a variety of moisture conditions with both uncoated and coated nylon fabrics. The coating material used was a polyamide resin formulation expected to increase friction between yarns and to reduce yarn slippage. It was applied in three different amounts. The specimens were coated, and conditioned according to a statistical design to randomise the specimens.

Table 1—Effects of Coating and Moisture on Piercing Strength of Nylon Fabric

Coating on Fabric, per %[1]	Moisture Condition of Fabric: 0% Relative Humidity — Piercing Strength, lb.[2]	0% Relative Humidity — Coefficient of Variation, %	50% Relative Humidity — Piercing Strength, lb.	50% Relative Humidity — Coefficient of Variation, %	93% Relative Humidity — Piercing Strength, lb.	93% Relative Humidity — Coefficient of Variation, %	Wet — Piercing Strength, lb.	Wet — Coefficient of Variation, %
None ..	705	6·7	721	4·7	708	5·6	649	5·7
1·3 ..	744	5·0	771	1·6	750	2·8	663	3·1
4·5 ..	747	7·0	778	2·1	677	7·6	651	5·6
11·4 ..	796	3·1	810	2·3	764	4·9	680	3·4

[1] The coating was composed of: polyamide resin 94 from General Mills Inc., 800 g.; rosin, 100 g.; hydroabietyl alcohol, 50 g.; tricresyl phosphate, 30 ml.; and isopropanol-toluene (30 to 70) to make 4 litres. It was applied by dipping and passing the fabric through squeeze rolls. Applied full-strength, the solution produced an 11·4% coating based on the weight of the original fabric conditioned at 23 C. and 50% relative humidity. The mixture was diluted 1:4 with the isopropanol-toluene solvent to produce the 4·5% coating and 1:9 to produce the 1·3% coating.
[2] Each value is the average of 12 test results.

After coating and laminating, the specimens were conditioned at four different moisture conditions. The first group of specimens was dried over phosphorus pentoxide; the second group was conditioned at 50 ± 4% relative humidity; and the third group was conditioned at 93% relative humidity over a saturated solution of ammonium phosphate. These three groups of specimens were conditioned for seven days prior to testing. The fourth group of specimens was immersed in water 24 hr. before testing.

Table 1 summarises the results. The coefficients of variation are quite low, considering the nature of the test and the material tested. It is possible by means of this procedure to observe trends and small differences that would not be apparent with a less precise method. For example, Table 1 shows that the nylon fabric has maximum strength at 50% R.H. for any given amount of coating on the fabric. It is also apparent that the strength increases with increasing amounts of coating. The method is satisfactory with wet fabrics, as is evidenced by the low coefficient of variation of the wet-fabric test results. The authors believe this laminating technique may have application in preparing specimens of high-strength fabrics for other physical tests.

Recommended Laminated Procedure

The nylon cloth is cut into 5½-in. squares, which are placed in flat Saran tubing in which a 2-in. diam. hole has been cut. (Holes may be cut in as many as 25 pieces of tubing at one time by means of a sheet-metal punch.) The tubing is covered with sheets of cellophane to prevent sticking to the platens. The laminate assembly is centred in the press, which has been preheated to 200°C. The assembly is laminated for 4 min. at 2 p.s.i. and 200°C.

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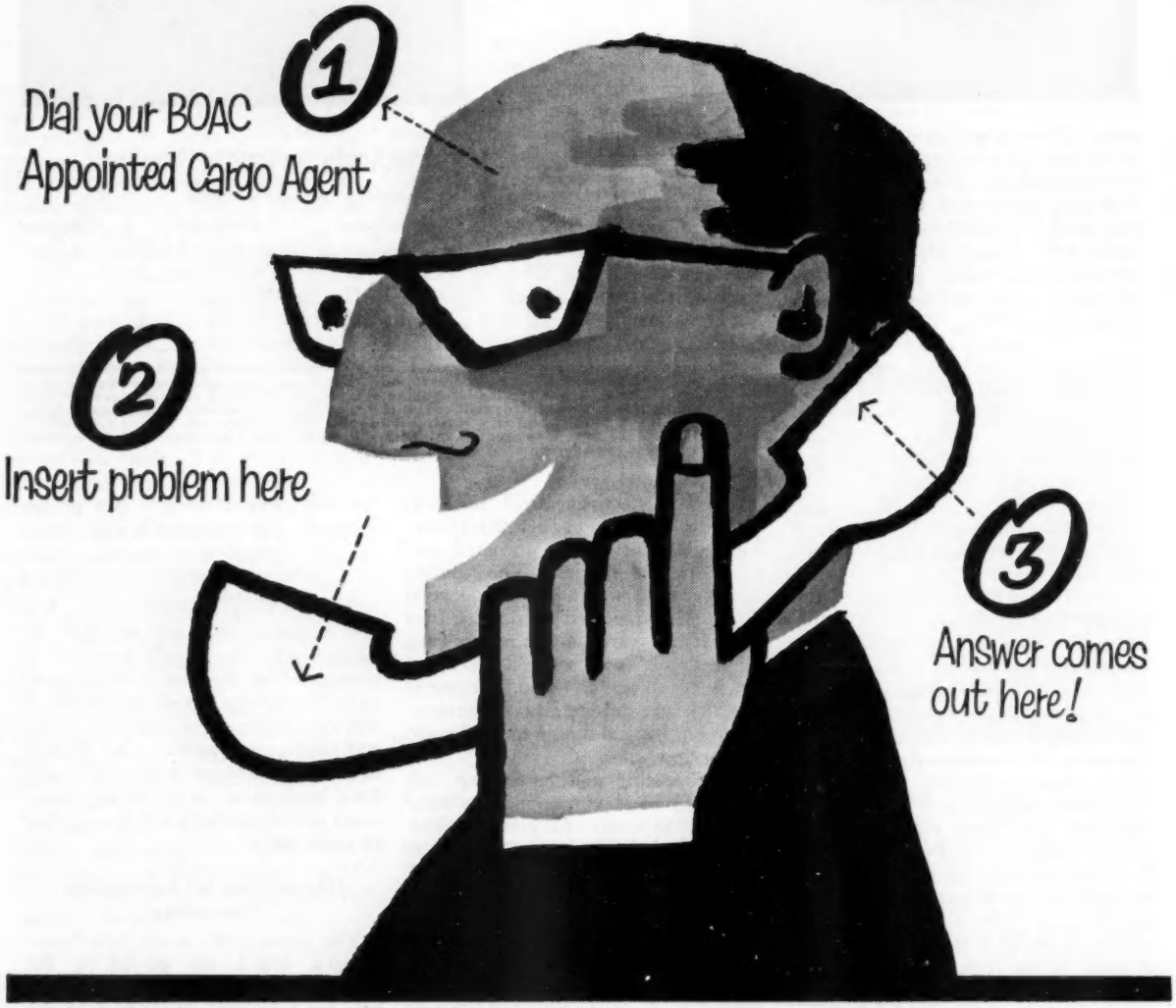

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Reduce Noise—Increase Efficiency in Textile Plants

A long-range programme concentrated on noise reduction involves an analysis of noise distribution throughout the entire mill. From this it is much easier to determine accurately where noise must be reduced to satisfactory proportions

By P. W. SHERWOOD

THE importance of industrial noise control is highlighted by a recent estimate that American business loses some 4 - 5 million dollars daily as a result of efficiency drop and absenteeism caused by noise. The loss is compounded by the legal liabilities incurred by industry under workmen's claims for loss of hearing. Concerned primarily with health aspects, industrial associations and state agencies are developing standard limits for noise of different frequencies which may soon become mandatory in many locations. This aspect has been discussed by a recent article in this magazine.

Even below the level where noise constitutes a hazard to health, however, it will interfere with efficient communications, i.e. the industrial noise drowns out speech needed for efficient job execution. For a complete solution of the noise problem in textile plants, a complete survey must be undertaken and measures of noise suppression must be adopted which we shall discuss below. However, it is sometimes possible to solve local noise-occasioned efficiency problems very quickly by relatively simple and inexpensive steps.

An example of this was provided in a large textile plant in Massachusetts where excessive noise was observed due to vibration in the concrete floor caused by running looms. The solution, in this case, was simple. A survey showed that the disturbing frequencies were in the region of 1 to 100 cyc./sec. Installation of 1 in. thick felt pads under the loom feet reduced the floor vibration by about 10 decibels in this frequency region.

The solution to the noise problem is not always simple and inexpensive, especially in some textile plants, in which there are numerous different sources of noise, many quite complex. Where communication by speech is not an essential part of the job, one reliable method of noise protection for workers is also one of the simplest, namely the use of individual ear protectors. There are several types of device commercially available for this purpose. Most common is the use of (*a*) substances moulded to the ear by the user (e.g., wax or treated cotton); (*b*) moulded plugs of rubber or other flexible materials; (*c*) muff-type protectors; and (*d*) ear valves, i.e. an ear filter which will permit the passage of ordinary speech but which will close when exposed to the pressure of sudden loud noises.

Such personal protectors are highly effective if, *and only if*, they are fitted so that a tight seal is formed in the ear canal. Only if the individual wearing these devices has a sensation of pressure, can they give adequate protection. Unfortunately, this feeling of pressure is objectionable to most people. To obtain even reasonable acceptance, an extensive educational campaign is therefore generally called for. Even then, no assurance is given that the ear protectors will be worn at all times.

A long-range programme for noise reduction must therefore resort to other means of effecting control. Such a programme involves an analysis of noise distribution throughout the plant, along with a determination of places where noise reduction is needed, and how much reduction must be accomplished.

The second step is to find the noise sources and the means by which noise is being transmitted from the source to control locations. Finally, steps must be taken to decrease the noise level within tolerable limits.

It is no job for an amateur and some textile concerns have organised groups of specialists to take charge of the noise control programme on a company-wide basis. An important part in such programmes is also played by consulting engineers specialised in the field.

The way for these noise control teams is greatly facilitated if management and operating supervision have an understanding of the problems which are encountered and the solutions which are available in a noise reduction programme.

The most objectionable noise is usually generated by four different methods:—

(1) **Mechanical vibration, e.g., automatic screw machines, rotating machinery.**
(2) **Mechanical impact, e.g., much textile machinery.**
(3) **Hydraulic and aerodynamic flow, e.g., water pipes, air jets.**
(4) **Magnetic induction, e.g., transformer or motor humming.**

Many noises sources actually consist of a combination of different noise types. The problem is still more complicated by the fact that each noise source has a different distribution in the frequencies (i.e. pitch) of the emitted noise. The composite sound from any one source is transmitted in various ways.

Direct Travel Through Air

This is the most important component at close range. Normally, the sound transmitted in this manner decreases at the rate of 6 decibels every time the distance from the source is doubled. However, direct transmission is not uniform in every direction; the noise source itself may be directional. Further, there may be interference with direct transmission in some directions and not in others. Aside from personal protection, the only step which can be taken against directly transmitted sound is to reduce the noise level at the source. There are many ways in which this can be accomplished—although most of them are quite costly.

Most obvious, of course, is the substitution of a less noisy operation.

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However, this step can only rarely be justified. The alternatives are to remove the machine to a location where a minimum number of employees (provided with protectors) are exposed to the noise, or to install sound insulation around the noise source. Another approach which is frequently effective for heavy moving machinery is to anchor it on resilient mountings. Several types of mounting are commercially available — their selection should by all means be left to experts. Reciprocating or impact machines generally call for a different type of treatment. Here, it is generally advisable to mount the machinery on to a massive concrete block.

In Reflection from Walls or Reverberation

Noise is carried directly from the source to a wall and from there to the receiver. This is the most important component of noise, inside the same room but at some distance from the source. The amount of noise transmitted in this manner depends greatly on the sound reflectiveness of the wall. Considerable improvement in noise level can be attained by covering the wall, ceilings and, if necessary, the floors with material of high sound absorption coefficient.

For high sound absorption, one uses relatively soft materials of high porosity into which the sound waves penetrate and which absorb much of the sound energy. The degree of porosity is critical (neither too much nor too little porous). Location and mounting methods for the materials are similarly important. The most commonly employed form for reduced sound reflection materials is acoustical tile or similarly treated sheet. Where it is not practical to mount these devices on walls and ceiling, much can often be gained by suspending an acoustical baffle from the ceiling.

Transmission Along Structural Parts

Such transmission can occur along floors, piping, etc., to which the noise source is attached. Noise can be transmitted by this means over considerable distance. The usual remedy is to separate the vibrating source from the structural transmitter by the insertion of a resilient mount (e.g. springs, rubber materials, etc.).

Room-to-Room Transmission

Here noise passes through separating walls. Two basic rules apply here: (*a*) sound is transmitted more readily by lightweight than by dense wall materials and (*b*) walls transmit low-frequency sound more readily than high-frequency sound. The obvious remedy is to use thicker walls and walls of heavy materials. This may, however, be economically unfeasible and much can be gained in suppression of wall-carried noise by the use of double walls which are separated by an air space. Here, noise reduction is favoured by increasing the width of the air space.

Developments in Dyeing and Printing

(*continued from page 371*)

In which *R* represents an alkyl radical containing at least six carbon atoms while *X* represents the residue of an acid. The presence of such a substance in the padding liquor has the effect of neutralising the unequal affinities of the different dyes present for the cellulose fibre material being padded so that the fabric is ultimately found to have the same uniform shade throughout its length. This corrective effect is substantially independent of the temperature of the padding liquor so that it is not necessary to maintain the liquor at a constant temperature.

Experience shows that the desired corrective effect is obtained when there is present in the padding liquor 3 to 10 grams of the quaternary compound per litre.

Especially suitable substances conforming to the above general formula include hexyl-pyridinium bromide, octyl-pyridinium sulphate, dodecyl-pyridinium formate or acetate, cetyl-pyridinium chloride and octadecyl-pyridinium chloride—the last named substance has the formula given in Fig. 10.

The manner in which use can be made of these quaternary compounds is illustrated by the following example.

In the first place a padding liquor is prepared to contain

15 grams of a leuco vat dye ester sodium salt
1 gram of sodium carbonate
10 grams of sodium nitrite (oxidant)
5 grams cetyl pyridinium chloride

Water to make one litre.

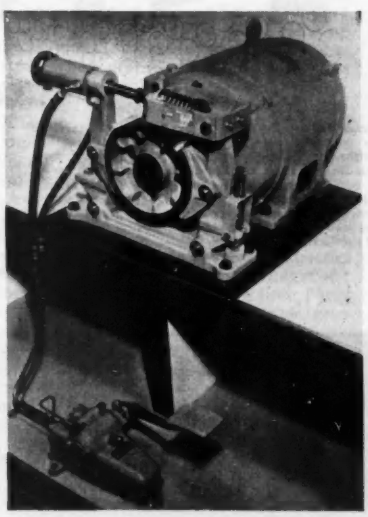
Cotton fabric is padded at 70°C. so as to give a 100% liquor pick-up. It is then dried and treated at 70°C. in a liquor containing per litre 20 c.c. of sulphuric acid of 66 Be. The resulting fabric has a uniform depth of shade throughout its length.

New Hydraulic Brake

A new Hydraulic "Perigrip" brake introduced by Associated Electrical Industries Ltd. (Motor and Control Gear Division) Rugby, is available in 8, 10 and 12 ins. drum sizes with braking torques up to 400 lb. ft., and is specially suitable for long travel motions on overhead cranes.

Many of the parts are interchangeable with those used on the company's range of electrically-operated brakes, but in place of the usual electro-magnetic device on the operating arm, the new brake has a simple hydraulic receiving unit. This receiver is actuated by oil pressure delivered by a foot-operated transmitter unit to which the driver's brake pedal is attached. The hydraulic fitments are manufactured by Exactor Ltd.

The brake is so constructed that the shoes are normally "off"; and by movement of the pedal, the braking torque can be applied and increased smoothly up to the maximum permitted by the brake mechanism. The advantage of this over the positive "snap" action of an electric brake when applied to the travel-motor of an electric crane, is that it minimises any tendency for the load to swing when the crane is stopped suddenly.



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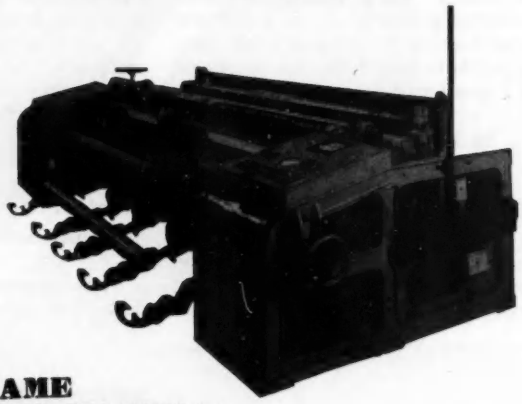

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Textile Trade and Prospects

Lengthening Order Books in Lancs.

According to the U.S. Department of Agriculture, sharply increased exports and a small rise in domestic mill consumption are reducing cotton stocks this year. The carryover of about 7·6 million bales estimated for August is 15% below a year earlier and only slightly more than *half* the record high of 1956. Disappearance of cotton in the U.S. during the 1960-61 marketing year will probably be around 14·5 million bales. This compares with about 16 million bales during the 1959-60 marketing year. The decline is expected to result from lower exports and smaller domestic mill consumption. Exports of cotton, it is pointed out, may fall by 1 to 1¼ million bales below the estimated total of around 7 million bales this year, the second highest export of the postwar period. Early season estimates point to larger cotton production in the foreign free world than the relatively small 16·3 million bale crop of 1959-60. On the other hand, consumption in the foreign free world is expected to be at a record high, and some further rebuilding of cotton stocks appears likely. Mill consumption in the U.S. during the 1960-61 season will probably be about 8¾ million bales compared with 9 million bales this season. The yield per acre in the U.S. has been trending upwards for many years. If the yield this season should be at the level indicated by the trend, production in 1960 would be about 14·7 million bales.

In Lancashire, holidays are still keeping production below the present demand. The summer itself, however, has had a considerable restraining effect on wholesale and retail sales and this, of course, has been reflected in the total turnover. As it is, most order books are in a healthy state but delivery dates are slowly lengthening, a state of affairs which can be dangerously complacent in view of the mythical stability it seems to offer. Nearly every class and type of yarn has been asked for but firm orders have only been in modest weights. Home trade account has absorbed practically all the available yarns, the bulk of transactions have concerned standard weaving qualities in medium counts. Fine counts have been reasonably well supported but in certain numbers a little more active interest would be welcome. Hosiery qualities, and many specialities in folded and novelty effects, also an increasing range of blended types are in excellent demand. Coarse counts and condenser types are in keen request and one or two lines are in very short supply. The closing of so many mills has seriously affected supplies of the better types of waste, comber waste particularly.

A similar state of affairs exists in weaving sections. Export orders are still meagre but home trade account can—at present—absorb all that comes off the looms. One or two finishing concerns could well take on more work but grey cloth coming forward is not sufficient in itself to keep them fully occupied. Most types of apparel cloths are well booked ahead; in some, delivery is now impossible before the middle of next year. A wide range of plain, dobby and jacquard patterns have been dealt in, in all cotton, rayon and mixtures. Roller and screen printed styles in traditional and contemporary designs are selling well. Furnishing cloths of all kinds have changed hands readily and there is a shortage of orders for practically every type of household fabric. Quick off the mark, a few firms are already advertising their beautifully packed lines for the Christmas trade. In certain industrial cloths the offtake has been better than for the past six months.

Wool Consumption and Production

U.K. raw wool imports during the first six months of 1960 totalled 372·4 million lbs. (actual weight) compared with 421 million lbs. in the corresponding period 1959, a reduction of 11%. Trade and Navigation Accounts show that, within that over-all decline, wool imports from Australia and South Africa each fell by 25%, but this was partly balanced by an increase of 26% in purchases from New Zealand. Australia provided 142 million lbs. in six months of 1960, compared with 191 million lbs. in the corresponding period of last year; New Zealand 106 million lbs. against 84 million lbs.; and South Africa 30 million lbs. against 39·6 million lbs. Britain's wool tops exports for the first half of 1960 reached 51·6 million lbs., an increase of 14% on the similar period of 1959—which set up a post-war record—and worsted yarn exports are running at the highest rate of recent years. Wool cloth exports, however, barely maintain last year's rate, partly owing to the early exhaustion of the American import quota.

Wool consumption, top production and worsted yarn deliveries in the U.K. during June were slightly lower than in May, reports the Wool Industry Bureau of Statistics. Rate of wool consumption was 2% lower than in May and 7% lower than a year earlier; and the corresponding declines in top production were 3 and 9% respectively. Worsted yarn deliveries, while lower than in May, were 2% higher than a year earlier; and woven fabric deliveries were 6% higher than in May and about the same as a year ago. June output figures were: Wool consumption, 39·95 million lbs. (clean); top production, 26·13 million lbs.; worsted yarns delivered, 19·29 million lbs.; woven fabrics delivered, 29·48 million sq. yds.; blankets delivered, 2·32 million sq. yds.

Australian wool exports totalled 1,399,900 thousands lb., for the wool year ended June, 1960, compared with 1,284,726 thousand lbs. the previous season reports the Australian Council of Wool Selling Brokers. For the first time, Japan exceeded the U.K. as the largest buyer of Australian wool; Japan taking 340,427 thousand lbs. compared with the U.K.291,120 thousand lbs. Other large-scale purchases (in thousand lbs.) included: France 165,582; Belgium-Luxemburg 108,710; West Germany 79,682; Italy 139,174; U.S.A. 42,089; and U.S.S.R. 39,254.

According to estimates compiled by the U.S. Dept. of Agriculture, world wool production for 1960—covering the 1960-61 marketing season—will be about 5,625 million lbs. (greasy basis), or 1% more than the record of 5,575 million lbs. set up the previous season. As a set-off against expected small declines in Australia and South Africa, it is reported that New Zealand anticipates a record clip around 580 million lbs. Small increases are visualised in the U.S.A. and Argentina, and a 13% advance in Uruguay. European production is expected to show little change but increased sheep numbers in the U.S.S.R. indicate a 5% increase in the wool clip of that area.

World consumption of clothing fibres increased from 8,848,000 metric tons in 1948 to 13,432,000 tons in 1958, showing a rise of 52% over the ten years, and further to 14,118,000 tons in 1959. Wool consumption increased over the 10 years 1948-58 from 1,139,000 to 1,265,000 tons, and further to 1,350,000 tons in 1959, a rise over the 11 years of about 18%.

Of world total fibre consumption in 1958, cotton accounted for 69%, rayon 17%, wool 10%, and synthetics 5%. Consumption per head of all fibres in 1958 was 4·83 kilogs., of which cotton represented 3·36 kg., wool 0·47 kg., rayon 0·85 kg., and synthetics 0·15 kg.

Linen Trade Review

The backlog of orders accumulated earlier in the year has enabled mills to maintain production at capacity level, although recent bookings have been substantially below output. The arrears are being eliminated rapidly and it is hoped buying for autumn will provide the volume of business necessary to prevent a build-up of stocks, and the inevitable curtailment of output which would eliminate the narrow profit margin on which most firms are working.

Combining profitable working with competitive prices may become more difficult in the near future, as labour costs tend upwards and the effect of adverse harvesting conditions and crop damage are reflected in raw material prices. In view of the high cost of machine replacements some executives are querying the expected profit ability of extensive re-equipment programmes, and are reviewing their plans in the light of economic conditions now prevailing. Merchants and retailers are unanimous in their view that any attempt to increase margins by advancing selling prices would defeat its own aim through the immediate reaction on demand.

Reports from Continental flax growing areas indicate that harvesting is still proceeding under difficult conditions; the straw suffered considerable weather damage. Sales of new crop straw are limited mostly to higher grades for which good prices are being paid and must inevitably

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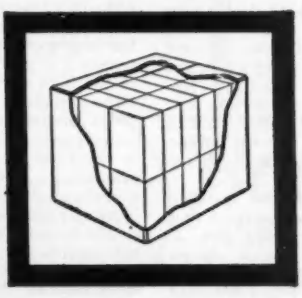

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be passed on to the user. It is obvious that there will be no easement in the supply position for high grade fibre during the 1960-61 season.

Labour is still concentrated on field work, consequently deliveries from scutch mills are small in bulk and variable in quality, with lower grades predominating. Prices are unchanged with Courtrai grades A, B and C on offer at £170, £175 and £180 per ton respectively. Little business is being done however as spinners generally have sufficient cover to carry on until the new crop prospects are more definite. No information is available yet regarding the prospects of exports from East Europe. Some grades of old crop Ralo tow are on offer, but at the current quotations of £118 for No. 6, and £128 for No. 8, they are considered unprofitable.

By the death of Dr. W. H. Gibson, O.B.E., D.Sc., the linen industry has lost a gifted worker, who helped it to weather successfully the difficult years between the first and second world wars, and who contributed largely to a solution of the raw material supply problem with the loss of Continental sources following the German invasion of France and Belgium in 1940. During his years as head of the York Street Flax Spinning Company's research department Dr. Gibson gained a wide experience of the day-to-day problems of raw material production and manufacture. In 1926 he succeeded Dr. Vargus Eyre as Director of research of the Linen Industry Research Association, in which capacity he and his staff contributed materially in solving problems of raw material supply through the development of new flax strains with high fibre content. In 1940 Dr. Gibson resigned to undertake important work at the Royal Arsenal, Woolwich.

Executives in all sections of the industry will find much of interest in the latest Review of the Irish Linen Industry, just published by the N. Ireland Ministry of Commerce. The statistics contained in it cover raw material consumption, manufacture, and a detailed analysis of exports, including their destination, for the four years 1956 to 1959. Exports of linen goods, analysed according to the normal classifications, are given from 1926 onwards for comparison. Production statistics indicate that while the progressive downward trend of production of linen loomstate cloth is being offset to some extent by the increase in output of cotton and cotton/rayon mixture fabrics, this compensating factor is not operating in the same manner in the spinning section. Here the production of spun rayon yarns has declined by approximately 50% between 1951 and 1958. During this period production of flax yarn fell by approximately 27%.

Jute Stocks, Activities and Prices

Raw jute markets became firmer at the end of July due to a fair demand by overseas countries and buying by mills in Pakistan. This took place when imports of loose jute from up-country were limited because of lateness of the crop. Recently, however, less interest has been shown by spinners and offers of the fibre were more freely made. Markets in Pakistan are still sensitive as stocks in most consumers hands are small and a considerable amount of buying has to take place at a fairly early date. At the same time balers will try to force prices down and obtain a substantial part of the crop from cultivators at reasonable prices. Cultivators have not been keen sellers and supplies of loose jute coming on the market have been small. This situation may continue for a few weeks yet but eventually the bulk of the crop will be secured by balers. This is one reason why the cheapest time to purchase raw jute is usually early in the season when supplies are plentiful.

In deciding policy for season 1960-61 the government of Pakistan is to maintain export minimum prices on long jute at the existing levels but these will be issued on an f.o.b. basis. In the past, these minimum export prices have been notified on a c.i.f. basis; the new f.o.b. prices are expected to be issued fairly soon. Reports as to quality of present crop are good but there are indications that imports are lighter than usual and this may mean the ultimate yield from the acreage sown will be smaller than expected. Pakistan authorities, however, maintain that the outturn of the crop will be sufficient to meet both overseas and home demand.

A feature during the past month has been the disappearance of sellers willing to discount the generally quoted rates for white jute for forward shipment. At present, offers of white jute are being freely made for current shipment but most shippers are reluctant to enter into business in the forward position. The few offers made for forward shipment are generally at the same level as for the current position. Mill Firsts were £123, Mill Lightnings £116 10s., Mill Hearts £112 10s., and grade Hearts £107, c.i.f., U.K., for Aug./Sep. shipment. More offers of dark jute are also being made with grade Tossa-2/3 at £123, grade Tossa-4 at £116 and Continental Tossa-2/3 at £111 10s. Sept./Oct. and at £119, £112 and £110 for shipment a month further ahead.

During the period of rising prices at the beginning of August a fair amount of buying took place by both Continental and Dundee spinners. This covered immediate requirements but further buying should take place if prices show some reaction. Stocks in spinners hands are by no means large and with present crops just about equal to world consumption most consumers may come into the market fairly early to cover their needs ahead. The dearer markets in Pakistan at the beginning of August caused an alteration in E.P.C. levels and the greatest increases took place in the case of the lower grades of white jute. At present most shippers are willing to accept the official rates but very few are willing to discount the forward position.

The Calcutta goods market has become dearer for hessians and sackings despite an increase in stocks held by the Indian mills at the end of July. Speculators operating may have been one cause but Australia came into the market for corn sacks and this pushed the price of heavy goods to a high level. Quotations were advanced to 71s. 6d. for 10 oz. 40 in., and to 53s. 3d. for 7½ oz. with 11 oz. 45 in. at 78s. per 100 yds. f.o.b. Calcutta for Aug./Sept. shipment and 70s., 52s. 9d. and 77s. 9d. respectively Oct./Dec. B twills were at 214s. 6d. August, at 213s. Sept. and 197s. 9d. Oct./Dec.

Stocks of goods held by Indian mills at the end of July were 3,500 tons lower for hessians but 9,500 tons higher for sackings, compared with the end of the previous month but this overall increase had no effect on prices quoted. According to advices received from members of the Indian Jute Mills Association, the extent of voluntary sealing of looms for July was between 3% and 4%, inclusive of the June percentage. Some mills had, in fact, opened up looms which they had previously sealed while others have sealed only for the one month. This figure of between 3% and 4% is in addition to the compulsory sealing of 9% under the working time agreement. Due to the dearer raw jute position in Pakistan it was necessary for prices of medium and heavy yarns to be raised in the U.K. but prior to this a fair amount of business was placed by consumers and spinners and manufacturers are again well placed for delivery a fair distance ahead.

Silk and Man-Made Fibres and Yarns

August is a trying month for most traders in that holidays so badly affect production and deliveries in both yarns and cloths. Order books tend to lengthen still further and delivery dates in the middle of 1961 are being quoted for certain textiles. This upsets many British makers-up looking for new European markets where the quality of British merchandise is stimulating fresh business. Unless delivery dates are improved a good deal of new business will be lost and markets once lost are difficult to regain. A good volume of business has been put through on home trade account in dress fabrics available for immediate delivery. It is thought that a mild autumn may see rapid clearances of stocks of summer dresses which have sold slowly because of the poor summer.

A brisk demand has been noticeable in certain overseas markets, for furnishing fabrics and some dress specialities. South Africa is a case in point and in British-made shirtings, the demand is for "Terylene"/cotton blends but demand, unfortunately exceeds supply at present. Considerable interest centres around the latest worsted suitings in 100% wool and "Terylene"/wool and wool/mohair blends. In some sections of the trade there is an increasing demand for nylon gaberdines with silicone proofing, also blends of "Tricel" with strong rayon staple. The newer fibres are also being used increasingly in many types of woollen suitings.

Some Midlands manufacturers are concerned at the volume of imports from overseas' sources—principally the Continent—covering a wide range of knitwear in cotton, wool and blended yarns. Italian sources are sending in high quality knitted goods and this, of course, is as serious as the competition in medium and cheaper grades. Demand on the home market is brisk for most classes of knitted goods and warp knitters are doing extremely well. The range and variety of knitwear is enormous and still increases and jersey fabrics are as popular as ever with all ages. In the Leek area, moderate conditions apply with a fairly good demand for most classes of braids and trimmings but the labour situation is not as good as it might be. Business is reasonably promising for most smallwares and sewing thread manufacturers report plenty of forward ordering. Makers-up are probbaly as active as any despite the fine margins prevailing but the prevailing labour shortage is one factor retarding greater production.

Dielectric Heating - 3

Some further details of the uses to which dielectric heating can be put are given in this data sheet, being continued from data sheet No. 11.

The Woodworking Industry

A most important development in recent years in the woodworking industry has been the introduction of synthetic resin adhesives of the thermosetting type for the bonding and adhesion of wooden components.

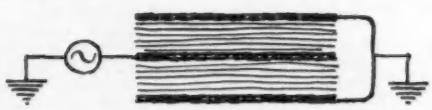
Setting of these resin adhesives proceeds at a rate largely determined by temperature. For instance, urea formaldehyde, one of the resins in common use, sets as follows:

TEMPERATURE	SETTING TIME
65°F	3 hours
80°F	1 hour
150°F	3 minutes
190°F	1 minute

The resultant bonded joint is equally satisfactory in each case. Most of the power supplied when dielectric heating is used is absorbed by the resin, the heat thus being concentrated where required and power consumption reduced to a minimum.

Plywood

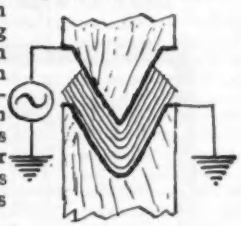
With dielectric heating consuming power only during the heating cycle, plywood can be produced with considerable savings in heating times and costs.



For example, in a press holding 100 3-ply ½" thick assemblies, the resin glue is set in 20 to 30 minutes, depending upon the dryness of the wood. An output of up to 60 cu. ft. of plywood is obtained per hour using a 25 kW H.F. generator.

Curved Laminated Sections

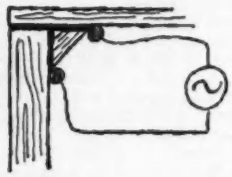
Curved laminated sections are being increasingly used in contemporary furniture, and with dielectric heating rapid production can be achieved using wooden shaping blocks in single daylight presses. An alternative method of providing heat by conduction from heated metal strips becomes increasingly slower as the total section thickness rises above 0.05 inch, as shown below:



TOTAL THICKNESS OF LAMINATIONS	*Comparative heating times in minutes*	
	CONDUCTION	DIELECTRIC
1 inch	20	4
¾ inch	5½	2½
0.6 mm veneer	1	1½

Furniture Assembly

Because of the savings in glueing processes already instanced, dielectric heating is being extensively used in the furniture trade. It leads also to reductions in labour and floor space, with the elimination of assembly jigs. The heating equipment can be placed directly in the production line, cutting handling to a minimum.



Resin-bonded Wood Chipboard

A substitute for natural timber is made from wood waste and chippings, broken down to a coarse size, mixed with synthetic resin and heated under pressure. Dielectric heating gives quick and uniform heating, and increased fluidity reduces the power required for the final pressing and curing operation. In a continuous process, the length of the press required is also reduced.

Blockboard

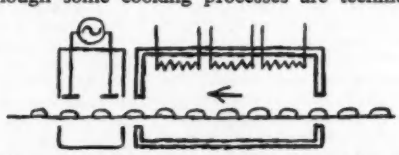
Production of blockboard by edge glueing strips of wood also provides an excellent use for dielectric heating, since considerable savings in time and labour can be effected owing to the large areas of glue line involved.

Other Resin-bonded Products

Dielectric heating is also used in the manufacture of other resin-bonded or impregnated products such as grinding wheels, impregnated woods, fabrics, felts, glass-fibre and similar products.

Foodstuffs

Increased use is being made of dielectric heating in many processes connected with foods; these include de-freezing and melting, sterilisation and disinfestation, drying of breakfast cereals, dog biscuits, rusks etc., heating of nuts to facilitate shelling and other similar types of application. Although some cooking processes are technically



possible, as for example bread baking, the 'unbrowned' product has so far proved unacceptable to the public and a completely dielectric process uneconomical. When combined with conventional baking, however, as now in the biscuit trade, where dielectric heating is being used to complete the baking of biscuits, it can produce normal biscuits in ⅓ to ¼ the usual baking time.

There are in fact so many potential applications of dielectric heating (and these applications are increasing daily as the chemical industry develops new products, as for example synthetic fibres) that the selection given in the present series of data sheets covers only a part of the whole field.

For further information get in touch with your Electricity Board or write direct to the Electrical Development Association, 2 Savoy Hill, London, W.C.2. Telephone: TEMple Bar 9434.

Excellent reference books on electricity and productivity (8/6 each, or 9/- post free) are available—"Induction and Dielectric Heating" is an example.

E.D.A. also have available on free loan in the United Kingdom a series of films on the industrial uses of electricity. Ask for a catalogue.

7568 A

Notes and News

Congo: Export Credit Insurance

In view of the present disturbances the Export Credits Guarantee Department has suspended cover for the time being on new business with the Congo Republic. Policyholders remain covered on existing business: those with "contracts" type policies are covered on all contracts already placed, whether goods have been shipped or not, and those with "shipments" type policies are covered on all shipments already made.

* * *

Norway Suspends Wool Import Duty

Norway is to suspend import duty on raw wool, noils, wastes, pulled and garnetted wastes and tops, from July 1, 1960, announces the Norwegian government. The tariff items in question are Nos. 53·01 to 53·05 inclusive. The duty, states the National Wool Textile Export Corporation, was 0·4 kroner per kilog, approximately equal to 3d. per lb.

* * *

New Appointment

Mr. H. Marsden has been appointed exclusive British agent for Scott Testers Inc., and the Norcross Corporation, U.S.A. He formerly served as technical advisor to the Manchester Branch of Leesona Corporation (formerly Universal Winding Co.) in which capacity he had charge of the Unisel Division which handled the sale of Norcross viscometers throughout the U.K. Mr. Marsden has been very active in business and professional work related to the Leesona Corporation and during this period has had extensive experience with many viscosity measuring and controlling problems in diversified industries. In particular, he has worked with various solvent viscosity control problems in sizing and finishing operations, general quality control in the textile field and many different viscosity polymerisation and end point processes in the chemical industries. He is a Member of Council and Fellow of the Textile Institute, and chairman of its Textile Terms and Definitions Committee, his business headquarters are 78 Gatley Road, Gatley, Cheshire.

* * *

New "Terylene"/Worsted Uniform Jackets

The first batch of "Terylene"/worsted summer weight uniform jackets were recently issued to 500 sergeants and constables in the City of London police force—the first force in the country to change to "Terylene" from the conventional serge. These jackets will be worn between June and September each year.

The former unlined serge summer jacket, weighing 2 lbs. 14 ozs., has been in constant use for over 50 years. Wearer trials with the new lined lightweight "Terylene"/worsted jacket, weighing only 1 lb. 10 ozs., began in October, 1959, when P.C. N. Niblo went on a five-week visit to the U.S.A. and Canada. P.C. Niblo found the jacket cool, comfortable, hard-wearing and crease-resistant. A total of 700 men in the City of London Police Force will soon be wearing these new lightweight jackets.

Textile Machinery Order from U.S.S.R.

Platt Bros. (Sales) Ltd. (a subsidiary of Stone-Platt Industries Ltd.) have secured another contract from the U.S.S.R. totalling approximately £1¾ million. A large part of the equipment to be supplied on this latest order is for a complete "New Continental" worsted spinning plant to be supplied by Prince-Smith and Stells Ltd., Keighley. In addition, the contract covers worsted finishing machinery and units of cotton spinning machinery including the latest "Hartford 8" combers.

* * *

Nylon Plant Extension

To meet the expected increase in demand for nylon from the textile and plastics industries, I.C.I. has decided to expand capacity for nylon polymer. Existing I.C.I. plants and the one at present under construction are designed for the production of nylon 66 polymer, but this latest extension, which it is estimated will cost approximately £10 million, and which will have a capacity of about 15,000 tons per annum. will produce caprolactam, the monomer for nylon 6 polymer, not hitherto produced in Britain.

* * *

New Elastic

Lastex Yarn and Lactron Thread Ltd., an associated company of the Dunlop Group and of United States Rubber Co., announce plans for the manufacture of Vyrene in Britain. Vyrene is U.S. Rubber Co's new synthetic elastomer which has aroused so much interest on both sides of the Atlantic, and which is expected to open up an entirely new field in fine elastics. Vyrene will be complementary to Lactron and Lastex. These rubber products are the basis of many elastic fabrics, and further technical development of their outstanding properties will continue. Vyrene is non-rubber. It can be spun into fine threads and, in spite of its fineness, is said to have remarkable resistance to the effects of sunlight, oil and perspiration, and will withstand laundering and dry-cleaning.

Vyrene thread covered with nylon and other fibres has already been successfully launched in the U.S.A. in a wide range of fine elastic fabrics for corsetry, swimwear and lingerie. Its high modulus and great tensile strength give firm figure controlling properties to fabrics that are light and comfortable to wear. Vyrene is a man-made fibre of the linear polyurethane type.

* * *

Fashion Colours for Spring and Summer 1961

The colour ranges for knitwear, wool, silk and man-made fibres and cotton were sent to members of the British Colour Council's Women's Wear Division and the appropriate fibre sections in May. These ranges will be followed by the leather colours in July, the millinery colours in August and the hosiery colours in September. Eleven of the colours shown on the leather card will be the same as those on the Spring and Summer 1961 Fashion Accessories Card. This card is now available to members and non-members, price 21s.

* * *

Wool Cloth and Yarn for Japan

The National Wool Textile Export Corporation announces that, under recently concluded trading arrangements, Japan will import £3,150,000 worth of wool cloth and yarn during the year beginning April 1, 1960. Whereas last year licences for these goods were for U.K. wool cloth and yarn only, the new arrangements indicate that licences may be used for wool cloth and yarn imports from any country except France and Italy, states the Corporation.

A mounted policeman wearing his new lightweight jacket is seen here outside St. Paul's Cathedral

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Move to Larger Works

Because of the increasing demand for their products, Allspeeds Ltd., manufacturers of the Kopp variable speed gear have moved the head office and works to Royal Works, Atlas Street, Clayton-le-Moors, nr. Accrington. With a floor area of over 120,000 sq. ft. the new works incorporate all modern services. In particular the machine shop has been laid out and equipped to enable the latest flowline production methods to be used.

* * *

Change of Address

High Duty Alloys Ltd. have transferred Birmingham sales office from Queen's College Chambers, Paradise Street, to 369 City Road, Edgbaston, Birmingham 16 (Tel: Bearwood 2344-5. Mr. K. H. Miller, area sales executive for the sheet and extrusion division, and Mr. K. M. Herrington, area sales executive for the Casting Division, are at the new offices.

* * *

Wool Duty Disappoints Scots

Scottish tweed manufacturers are disappointed at an American report that the U.S. tariff quota on imported woollen cloth is to be replaced next year by a higher tariff. Mr. J. Ballantyne (president, National Association of Scottish Woollen Manufacturers) said: "If this report is true, it is good in so far as it means the abolition of the tariff quota which has caused great dislocation and damage to the Scottish tweed industry during the past four years and has been futile in protecting the American domestic woollen industry from Japanese and Italian competition. But the replacement of the quota by a duty of 38%—in addition to the standard duty of 37½ cents/lb.—would be almost as great a barrier as the quota, though we would no longer suffer the uncertainty which has been such an evil feature of the quota system. It is unfair while we in Britain have swept away virtually all restriction on American cloth and clothes coming into this country, that the U.S. administration should perpetuate discrimination against our woollen and worsted cloths going over there."

* * *

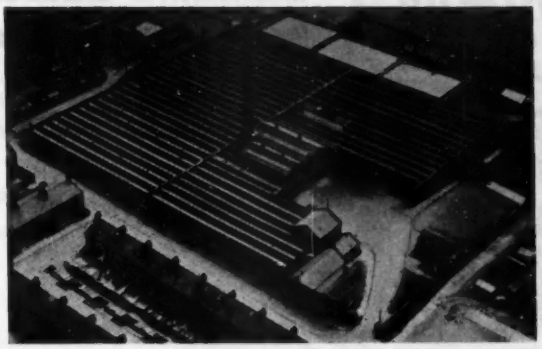
New Address

The AEI Midland Regional Office in Birmingham has been moved from John Bright Street and Hospital Street to Gloucester House, 65 Smallbrook, Ringway, Birmingham 5. Tel. Nos.: Midland 6335 and Midland 9551 The special sales offices of AEI-Birlec Ltd., AEI Lamp and Lighting Co. Ltd., AEI Sound Equipment Ltd., the Cable Division, Radio and Electronic Components Division, and Telecommunications Division, as well as Siemens Ediswan Lamps and Lighting, the X-Ray Service Department, and the Construction and Erection Departments remain at their present addresses.

* * *

Wool and Top Stocks in Britain

Wool stocks in the U.K. at May 31 were 228·0 million lbs. (clean weight), some 7·1 million lbs. lower than a month earlier and 37 million lbs. less than at May 31, 1959, states the Wool Industry Bureau of Statistics. About 25 million lbs. of the decline compared with a year ago was in merino qualities and was partly due to the gradual reduction during the year of Government strategic reserves of imported wool, now in course of liquidation. Stocks of tops in the U.K. at May 31 were 72·1 million lbs., of which 53·6 million lbs. were merinos and 18·5 million lbs. in other qualities. The total was 2·3 million lbs. lower than at April 30, but 5·5 million lbs. higher than at May last year.



Aerial view of the new works of Allspeeds Ltd., at Clayton-le-Moors

New Companies

Alf. Smith (Textiles) Ltd. Private. Reg. May 19. Capital £1,000 in £1 shares. Manufacturer of cotton, wool, rayon, etc. A. L. Smith, E. Smith. Registered Office: Radford Mill, Bolton Road, Darwen.

Exportex Ltd. Private. Reg. May 20. Capital £1,000 in £1 shares. Spinners, weavers, importers and exporters. S. L. Kejriwal and P. D. Kejriwal. Solicitors: Peake & Co., 6 Bedford Row, W.C.1.

W. H. Wagland Ltd. Private. Reg. May 16. Capital £10,000 in £1 shares. Manufacturers agents, merchants and distributors. G. R. Wagland, A. H. Wagland, F. H. Bye. Registered Office: 51 Lloyd Baker Street, W.C.1.

Crawford, Lee and Walker Ltd. Private. Reg. May 24. Capital £1,000 in £1 shares. Manufacturers, and retailers of linings, etc. J. Crawford, C. M. Lee and A. H. Walker. Registered Office: 46 Bloom Street, Manchester 1.

ILO Textiles Ltd. Private. Reg. May 23. Capital £2,000 in £1 shares. Manufacturers and dealers in cloth, etc. I. Barsam, K. Kornbluth. Registered Office: 51/52 Avenue Chambers, Vernon Place, W.C.1.

B and M Nylon Shops. Private. Reg. May 25. Capital £1,000 in £1 shares. Dealers in nylon, Terylene and similar materials. C. H. W. Lumb and M. Lumb. Registered Office: The Villa, Hemingbrough Selby, Yks.

Elco Fabric Ltd. Private. Reg. May 30. Capital £5,000 in £1 shares. Objects: To carry on the business of Manufacturers of textile goods, etc. Elsie Whitaker and Arthur Whitaker, both of 25 Fairfax Road, Bingley, and J. A. Whitaker. Registered office: 11 Queen Street, Keighley.

Percy Simms Ltd. Private. Reg. June 1. Capital £1,000 in £1 shares. Importers and manufacturers of wool, worsted, etc. Mrs. L. Simms, J. K. Sambrook. Solicitors: J. Eaton and Co., Bradford.

Y.S.F. Converters Ltd. Private. Reg. June 1. Capital £150,000 in £1 shares. Top-makers of all kinds of wool or hair, etc. G. Clegg, S. Morton. Solicitors: Wade and Co., Bradford.

Dreyfus and Co. (Aust.) Pty. Ltd. Particulars filed June 8, 1960. Capital £50,000 in £1 shares. Merchants, exporters and importers of wool of all kinds, etc. Ling House, Dominion Street, E.C.2.

Delhi Cloth and General Mills Co. Ltd. Particulars filed June 8, 1960. Capital Rs. 70,000,000. Registered in India on March 26, 1889, to carry on the business as ginners, spinners, weavers and dryers of cotton, etc. 20-21 Laurence Lane, Cheapside, E.C.2.

J. and W. Fabrics Ltd. Private. Reg. June 8. Capital £1,000 in £1 shares. Worsted manufacturers, etc. Allin and Eric Allin. Registered office: 41 Spring Gardens, Manchester 2.

Smith, Shepherd Ltd. Private. Reg. May 6. Capital £1,000 in £1 shares. Buyers, processors and dealers in yarns and fibrous substances of all kinds, and textile fabrics, etc. Registered office: 23 Cheapside, Cleckheaton.

Moller Products Inc. (Great Britain) Ltd. Private. Reg. May 6. Capital £2,500 in £1 shares. Merchants, exporters and importers of all kinds of textiles, etc. Registered office: 22 Ribblesdale Place, Preston.

Albany Fabrics Ltd. Private. Reg. May 9. Capital £2,000 in £1 shares. Manufacturers and dealers in cloth, wool, worsted, etc. Registered office: 27 Queen Anne Street, W.1.

Leefil Fabrics Ltd. Private. Reg. May 11. Capital £1,000 in £1 shares. Registered office: 37 Manchester Street, W.1.

A. W. Ward and Co. (Manchester) Ltd. Private. Reg. June 25. Capital £5,000 in £1 shares. Textile exporter. A. W. Ward and M. M. Ward. Registered office: 59 George Street, Manchester 1.

Harlaika Textiles Ltd. Private. Reg. June 27. Capital £2,000 in £1 shares. Importers and exporters of yarns, cloths, etc. S. Harlalka and H. Schoenfeld. Registered office: 48 Mosley Street, Manchester 2.

Blenheim Textiles Ltd. Private. Reg. June 28. Capital £2,000 in £1 shares. J. Spoor, D. Dixon, and N. Din. Registered office: Dunelm House, 11 Archbold Terrace, Newcastle-on-Tyne 2.

W. A. Johnson and Co. (Bradford) Ltd. Private. Reg. June 30. Capital £20,000 in £1 shares. Top maker and merchant. W. Johnson and Mrs. I. Johnson. Registered office: 9 Cecil Avenue, Bradford.

W. J. R. Fox and Sons (Batley) Ltd. Private. Reg. June 30. Capital £10,000 in £1 shares. Manufacturers, importers and exporters of wool, worsted, etc. W. J. Fox and Mrs. I. Fox. Registered office: 1 Well Lane, Batley.

Granville (Huddersfield) Ltd. Private. Reg. June 21. Capital £100 in £1 shares. Manufacturers of silk, rayons, cottons, woollens, etc. Registered office: Kirkman House, 54a Tottenham Court Road, W.1.

J. Jackson (Manchester) Ltd. Private. Reg. June 16. Capital £100 in £1 shares. General merchants, manufacturers of textiles, etc. Secretary: S. Jackson. Reg. office: 34 Charlotte Street, Manchester 1.

Molleycroft Ltd. Private. Reg. June 23. Capital £250 in 1/- shares. General merchants in textiles, drapery, etc. R. H. Mollan and E. M. Forward. Registered office: 16a Wakefield Road, Bruntcliffe, Morley, nr. Leeds.

Barlow and Jones (Condensor) Ltd. Private. Reg. June 17. Capital £100 in £1 shares. Spinning, weaving, manufacturing in cotton, woollen and other fibres. E. Cartwright, K. W. Baldwin. Registered office: Albert Mills, Stater Street, Bolton.

Barlow and Jones (Spinners) Ltd. Private. Reg. June 17. Capital £100 in £1 shares. Registered office: Prospect Mills, Prospect Street, Bolton. Other particulars similar to Barlow and Jones (Condensor) Ltd.

Barlow and Jones (Weavers) Ltd. Private. Reg. June 17. Capital £100 in £1 shares. Registered office: Albert Mills, Higher Bridge Street, Bolton. Other particulars similar to Barlow and Jones (Condensor) Ltd.

Barlow and Jones (Sales) Ltd. Private. Reg. June 17. Capital £100 in £1 shares. Registered office: 86 Princess Street, Manchester.

Goddard and Homersham Ltd. Private. Reg. June 17. Capital £500 in £1 shares. Manufacturers of and dealers in worsteds, yarn, etc. Registered office: 51 Coleman Street, E.C.2.

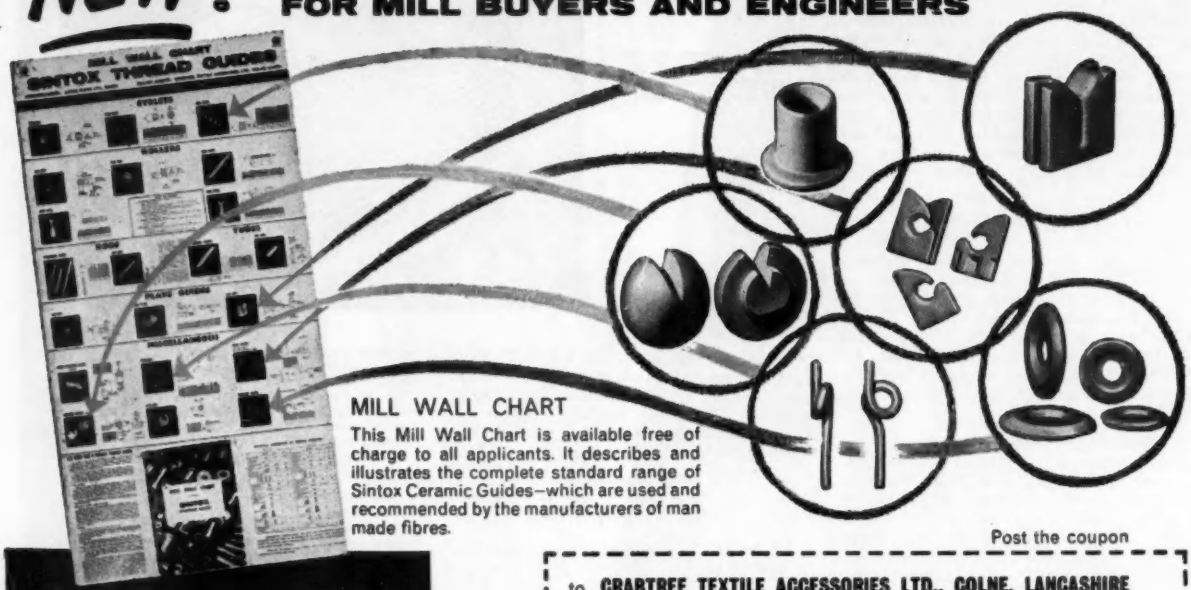
Tygadure Ltd. Private. Reg. July 5. Capital £20,000 in £1 shares. Manufacturers of yarns and fabrics. S. W. Livesey, L. Stevens, A. W. M. Hartley, P. L. Oliver. Registered office: Harvester House, 37 Peter Street, Manchester 2.

Teba Holdings Ltd. Private. Reg. July 7. Capital £13,000 in £1 shares. Objects: to acquire the share capitals of Teba Fabrics Ltd., Teba Textiles Ltd., Teba Textiles (Exports) Ltd., and Quality Woollens Ltd. J. Teba and G. Teba. Registered office: 2 Bentick Street, W.1.

Ashton and Peel Ltd. Private. Reg. July 8. Capital £3,000 in £1 shares. Manufacturers of textile combs, fallers, gills, and brushes. J. Ashton, H. Peel. Registered office: Dalton Lane, Keighley.

F. W. Musgrave and Co. (Export) Ltd. Private. Reg. July 8. Capital £2,000 in £1 shares. Manufacturers of wool and woollen goods, cotton silk, rayon, etc. T. H. P. Walton, E. Whitaker. Registered office: Providence Mills, Harris Street, Bradford 1.

NEW! CERAMIC GUIDE "STANDARD RANGE" CHART FOR MILL BUYERS AND ENGINEERS



MILL WALL CHART

This Mill Wall Chart is available free of charge to all applicants. It describes and illustrates the complete standard range of Sintox Ceramic Guides—which are used and recommended by the manufacturers of man made fibres.

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RECENT TEXTILE PATENTS

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814,637 High-Twist Yarns with Fixed Component Twist

VEREINIGTE GLANZSTOFF-FABRIKEN A.G., *Am Laurentiusplatz, Wuppertal-Elberfeld, Germany.*

A process for the production of high-twist yarns in which a part of the twist is fixed. Yarn withdrawn from a supply twist spindle is passed through a twisting tube rotating in the same direction as the supply twist spindle but at a slower speed, the component twist obtained being fixed by means of a heating means past which the yarn travels as it passes from the supply twist spindle to the twisting tube. The full twist due to the rotation of the twist spindle is restored to the yarn between the twisting tube and the yarn winding means.

819,185 Electronic Fancy Doubler

E. HAMEL, *Dahlweg* 102, *Munster/Westfalia, Germany.*

A fancy yarn twisting frame in which the speed of the back rollers and a reciprocating lifting or knop rail are varied at intervals by an electric signal initiated by means of a cam-disc operated switch for periods, the duration of which is obtained by a variable time relay which operates a further relay controlling the drive to the back rollers and lifting rail.

819,192 Finish for Nylon Yarns

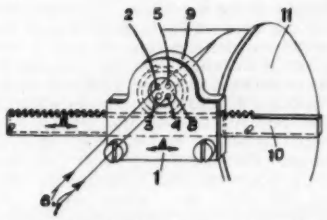
DOW CHEMICAL CO., *Midland, Michigan, U.S.A.*

Nylon yarn is finished for its construction into fabric by the deposition of a plastified film of mixed aromatic acid compounds obtained from the oxidation of coal. The coal acid compounds may either be the free coal acids, the water-soluble salts, particularly the alkali metal and ammonium salts, of the coal acids, or mixtures. The finishing film of the compounds may be plastified by a solvent material and the finish application may be accomplished with a solution of the coal acid compounds in the solvent material. Preferably, the film is plastified with water and the compounds are applied in solution in order to finish the nylon yarn.

819,583 Winding Several Threads on One Bobbin

BARMER MASCHINENFABRIK AKTIENGESELLSCHAFT, *Wuppertal-Oberbarmen, Germany.*

Apparatus for winding several threads on to one bobbin. A thread guide 1, which can reciprocate in the direction of arrow A in front of bobbin 11 is provided with a wheel 8 formed with holes 2, 3, 4 and 5 for receiving several threads, in the present case two threads 6 and 7. The wheel is rotatable in a housing 9 by a rack 10 about an axis situated between the holes 2, 3, 4 and 5 and at right angles to the plane of the wheel. The thread guide controls the running of the thread on to the winding spool 11 and is usually secured to the traversing rod. The two threads 6 and 7 guided through holes 2 and 4 are wound



around one another when the rack 10 moves in direction B and causes a corresponding turning movement of wheel 8. The false twist imparted to the threads changes its direction when the direction of movement of the rack is reversed. The movement of the twist-generating device is completely independent of the reciprocatory movement of the thread guide.

819,589 Preventing Weft Trailing in Box Looms

J. I. DUKES, 14 *Ribblesdale View, Chatburn, Clitheroe.*

Describes a method of preventing the trailing in of wefts in change box looms. Weft from shuttles in a multi-shuttle box is held when the shuttles are out of action by weft retaining devices, the mechanism controlling the devices being operated in synchronism with the box motion to release the particular weft for the shuttle which is about to be picked. The weft is inserted into the device on each beat-up of the slay by a fork lever actuated by a slide operated by a plunger mounted on the breastrail.

819,637 Linen Bleaching

BLEACHERS' ASSOCIATION LTD., *Manchester,* F. R. W. SLOAN, and W. H. MAGEE.

A process for the bleaching of fabric composed of linen fibres by means of alkali metal chlorite and without the use of a hypochlorite bleaching agent comprises treating fabric, which has not been subjected to a lime boil, at a temperature exceeding 60°C. with a solution of a pH below 7 containing at least 10 grams per litre of alkali metal chlorite. The fabric is one which may have been previously singed to remove surface hairs. The alkali metal chlorite is preferably sodium chlorite, and pH may be, for example, 3·5. The temperature of treatment is generally between 60° and 100°C., preferably 80°C. In one example, about 10 pieces of linen drill, woven from boiled yarns are singed and batched on to a Jackson kier. The liquor in the kier is set with 10 grams per litre caustic soda and 10 grams per litre soda ash and boiling is commenced for 4 hours with a pressure of about 10 lb. per sq. in. Following this period, the goods are washed and batched on to an enclosed jig where they are soured with dilute solution of hydrochloric acid about N/20 and washed again. The enclosed jig is then set with 50 gallons of water and to this is added 10 lb. of sodium chlorite and the bath adjusted to a pH of between 3·5 and 4·5 with formic acid, and temperature is raised to 80°C. and treated for 1 to 2 hours. The batch is then washed and returned to the kier where it is boiled for a further period of 4 hours at about 7 lb. pressure per sq. in. in a liquor set with 6.5 grams per litre caustic soda and 6.5 grams per litre soda ash. The goods are then washed and soured as previously and bleached again, the sodium chlorite concentration being 5 lb. per 50 gallons of water, pH 3·5 - 4·5. After a further period of bleaching of approximately 1 to 2 hours, the batch is washed and finally soaped at the boil for about ½ hour in 5 grams per litre soap. A full white, with good stability is obtained; the fluidity figure for such a bleach is about 4 and weight loss about 10%.

819,662 Constant Pressure Device for Winding Machines

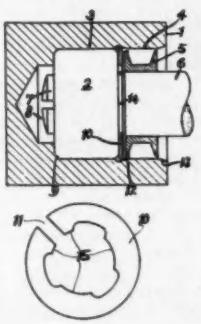
THOMAS HOLT LTD., *Atlas Iron Works, Rochdale,* and E. BRIERLEY.

Improvement in winding machines consists in means for regulating the motion of the yarn package with increasing diameter by using the rotation of the packages to drive a lightly-loaded feeler roller. This, in turn, transmits motion to mechanism to move the package as it builds up by positively moving out the yarn package at predetermined rate by predetermined pressure contact on the yarn package. No undesirable pressure is applied to the surface of the package and it is therefore advantageous in the winding of synthetic filaments.

819,692 Top Drawing Roller Assembly

J. J. RIETER AND CIE., *Winterthur, Switzerland.*

Describe a top drawing roll assembly for spinning machines. A carrier 1 for a covering of a top roll is provided with a bore 3 for receiving a journal bearing assembly 2. A bore 4 is provided coaxially of the bore and between the latter and the inlet opening of the bores. An axle 6 extends from the unit 2 and carries an annular sealing ring 5. The bearing unit includes a screw, the head 7 of which extends into a bore 8, and in this way a shoulder 9 is formed which serves as an abutment for the unit. A



spring ring 10 is loosely supported by the axle 6 and placed between the sealing ring and the bearing 2. At the entry side of the bore 4 a conical entry portion 13 is provided whose small diameter is adjacent to the portion 4 and is the same as that of the bore, and whose larger diameter is somewhat greater than the outside diameter of the untensioned spring ring. Between the bore 4 and the bore 3 an annular recess 12 is provided which has a conical cross section similar to that of the entry portion 13, the small diameter part of the recess being adjacent to the bore 4 and having the same diameter. The axle 6 is provided with a collar 14 between the sealing ring and bearing 2. The ring 10 is provided with at least three internal protuberances 15 having surfaces facing the axle 6 and being arranged on a circle the diameter of which is somewhat greater than the diameter of shaft 6, when the ring is untensioned. When the ring is pushed into bore 4 it is radially compressed and the inner surfaces of the protuberances are close to the periphery of collar 14 and centre the spring ring.

819,747 Reducing "Pilling" in Fabrics

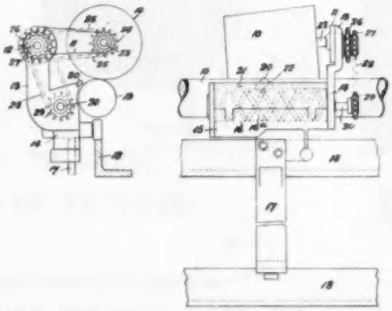
WOOL INDUSTRIES RESEARCH ASSOCIATION, *Torridon, Leeds.*

A treatment for fabrics or garments to reduce the tendency to pill. The method consists in treating one face only of a garment with a shallow impregnation of butadiene latex or butadiene-acrylonitrile latex so that this material adheres to the fibres at or near the face and prevents those fibres in contact with it from migrating. The face of the fabric so treated is that which is normally not visible during use or wear; in the case of a garment that face nearest to the body. The shallow impregnation may be applied by spraying, brushing or by means of a soft porous roller which carries or is supplied with a quantity of the impregnating material. Subsequently the fabric treated with the latex is vulcanised by any usual vulcanising process. The amount of material retained in the fabric may be between ½% and 15% of the total weight of the fabric.

819,861 Improved Winding Machine

T. HOLT LTD., *Atlas Iron Works, Whitworth Road, Rochdale,* F. HOLT and G. LEE.

Improved winding machines to wind packages of higher density, than is possible with the normal open wound package 10 indicates the yarn package which is mounted to move in an arc as the package builds up. 11 indicates the package carrying bracket pivoted at one end on a short shaft 12 mounted in the arm 13 of a bracket 14 attached to, a casing 15 housing a traverse cam 16. The casing 15 is supported on a bracket 17 carried on the frame 18. The package is driven by surface contact with a driving roller 19. 20 indicates a traverse guide which is reciprocated along a rod 21 carried at opposite ends in the casing by means of a peg 22, engaging in the double helical cam track 16*a* of the cam. Fast on the spindle 23 of the package holder is a sprocket wheel 24 wrapped by a chain 25, which also wraps a sprocket wheel 26 of a compound gear on the pivot shaft 12 in the arm 13. The other sprocket 27 of the compound gear is wrapped by a chain 28, which also wraps a sprocket 29 on the shaft 30 of the cam. The package driven by roller 19 transmits motion by way of the sprocket 24 and chain 25 to the sprocket 26 of the compound gear and thence through the sprocket 27, chain 28, and sprocket 29 to the traverse cam. In this way, as the package increases in diameter during build-up, the angular velocity of the package decreases and consequently the speed of the cam slows down in synchronism thereby maintaining the ratio between the rotational speed of the package and the reciprocations of the traverse constant at all stages of the build-up of the package. As the bracket 11 carrying the package is pivoted on shaft 12 the package, as it builds up, moves in an arc of movement about the pivot and there is no distortion in the chain-drive between the package and the compound gear.



819,923 Carpet Yarn Spinning Frame

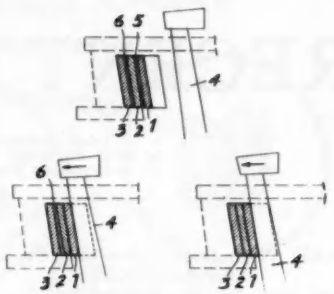
T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham.*

Relates to spinning machines primarily, though not exclusively, intended for use in the production of coarse yarns such as the pile material of tufted carpets. Large packages of yarn are spun on a single-sided ring spinning machine incorporating a drafting apparatus and a double row of spindles in staggered arrangement. Separate driving means are provided for assisting delivery to the drafting apparatus of slivers from the supply located approximately at floor level, the assisting means leading the slivers from the supply by an overhead path to the drafting apparatus. By this arrangement, it is possible to produce a carpet yarn (or similar coarse yarn) from the sliver at a high output rate, using only a single spinning stage and with the minimum floor space. Whereas a speed of approximately 1,000 r.p.m. is the maximum for flyer spindles, it is possible to attain as much as 3,000 to 4,000 r.p.m. by the present invention when using spinning rings of 7 ins. diameter, and to produce packages of about 10 ins. height and 4 lbs. weight.

819,934 Novel Picker Stick Checking Device

METAPIC S.A., *Holding Luxembourgeoise, 144 Rue de Hollerich, Luxemburg.*

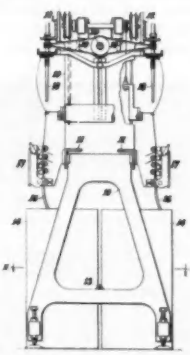
Describe a novel picker stick checking device for looms. The checking device is made up of elements, three in the case represented, 1-2-3, of a pliant material and of which at least the central portions are formed of leather. When the device is in its rest position the elements are slightly spaced, i.e. at least those parts of the elements which are directly exposed to the action of the picker stick 4, the spaces between the elements being indicated by 5 and 6. When the picker stick arrives at the end of its course, it first encounters element 1, which is beaten flat against element 2, whereafter both elements are in turn beaten against the third element 3. A really striking brake effect without a detrimental recoil is thereby obtained The invention also concerns a very simple, economic and rapid way of manufacturing such a device.



819,935 "Inverted" Sliver to Yarn Ring Frame

T.M.M. (RESEARCH) LTD., *Hartford Works, Oldham*

A method of spinning consists in coiling a sliver in a rectangular sliver can, and feeding the sliver upward from the can through drawing and advancing elements to a spinning spindle suspended above the can in a position which is inverted with respect to conventional arrangements. The machine frame comprises spaced spring-pieces 10, 10 which are tied by members 11, 11 and fixed spindle-rails 12, 12 together with a bar 13 extending along the plane of symmetry. The spaces between the spring-pieces at floor level form compartments which are rectangular,



into which sliver cans 14, 14 may be pushed, and from which they may be drawn out merely by sliding movement along the floor. The cans are located accurately, inasmuch as when they are pushed into the position in which their faces abut against bar 13 they are positioned correctly with respect to the other parts of the machine. The cans are preferably subdivided by partitions into two or four sections, although single-section cans may also be used. The slivers 16 are led upwardly through the drafting apparatus 17 to the inverted spindles 18, which are driven by bands 19 from a central driving shaft 20. A pneumatic suction device of suitable form (not shown) may be arranged on both sides of the machine above the drafting zone to remove broken ends occurring in the region of the drafting apparatus. This arrangement of "sliver-to-yarn" machine affords very valuable advantages over others previously proposed. Not only is a very considerable economy in floor space rendered possible,

as well as a reduction in the work load imposed upon the operative, but certain technical advantages are also noted. These arise from the very short distance through which the material is required to travel between the cans and the processing mechanism; the reduction of the length of unprocessed sliver minimises the risk of stretching and consequent variation in count of the spun yarn, and also avoids any tendency for the slivers to "dry out" or to accumulate deposits of fly or dust, particularly when the machine is not working.

819,974 Improved Loom

DEVELOPPEMENT TEXTILE SOCIÉTÉ ANONYME (DETESA), 26 *Hauptstrasse, Vaduz, Liechtenstein.*

A loom comprises a rotating body composed of an assemblage of adjacent co-axial warp-supporting plates which have a polygonal profile made up of rectilinear lengths alternated with notches, and which guide the warp threads over and under the weft threads. Separator plates alternated with the warp-supporting plates and having a circular profile, of greater radial dimension than the greatest radial dimension of the warp-supporting plates are interrupted by inclined notches aligned with the notches of the warp-supporting plates. The notches in the two kinds of plates together form grooves parallel to the axis of rotation for the introduction of the weft threads by weft-inserting needles. The aligned notches of the separator plates have recesses to serve as a movable reed for beating up the weft threads. Two sets of blades located adjacent the rotating body are inserted between the separator plates, the first sets of blades forming a feed device for keeping warp threads in alignment as they are fed on to the peripheries of the warp-supporting plates and the second sets of blades forming a device for extracting cloth leaving the rotating body.

819,991 Improved Lightweight Ring Spindle

PRESNA MECHANIKA, NARODNI PODNIK, *Stara Tura, Czechoslovakia.*

The object of the invention to devise a spindle for spinning machines which consists of light metal. The spindle has a lower stationary supporting part and an upper revolving part; the lower supporting part forms a thrust bearing for a shank which carries the upper part, and the upper part forms at its lower end a belt pulley. To avoid seizing of the bearing and slippage of the driving belts the bearing face of the thrust bearing on the lower part as well as the outerface of the pulley are provided with a sprayed-on layer of iron, or steel. The thickness of the layer will be 0·3 mm. to 1 mm., depending on the diameter of the bearing face or pulley provided with this layer.

820,276 Improved Glass Fibres

B. F. GOODRICH CO., 230 *Park Avenue, New York, U.S.A.*

Glass fibres are produced in one of the well-known ways and are coated with a metal alloy comprising lead, and 0·001 to 10%, preferably 0·001% to 5%, by weight of the alloy of a metal selected from the group consisting of sodium, potassium, magnesium, calcium, zinc, strontium, barium, aluminium, gallium, titanium, tin, chromium, manganese, cadmium, or iron. The metal coating is disposed in direct adherent relationship over the circumferential face of the glass base member. In one example, 0·0004 in. diameter glass filaments formed of a low soda-ash glass were coated with a lead-zinc alloy containing 1% by weight zinc by drawing the filaments individually through a molten bead of the alloy at a rate of 5,000 ft./min. and permitting the metal film deposited on each filament as the filaments are withdrawn from the molten metal to solidify. Two hundred and four coated filaments so prepared were twisted together to form a filament yarn. The yarn exhibits extraordinary resistance to wear and flexure. A quantitative measure of resistance to flexure failure was obtained by repeated flexing of the yarn through an arc of 150° at a constant rate in comparison with a similar yarn made from the same glass filaments, but without any coating. The uncoated glass filament yarn broke after about 5 mins. flexure, whereas the coated glass filament yarn did not fail or exhibit any apparent wear after being flexed for over 27,320 mins.

820,810 Improved Reels or Bobbins

TEXTILE PAPER TUBE CO. LTD., *Oakwood Mills, Romiley, Stockport.*

Improved reels for cotton or osher yarn in which the reel or bobbin is formed with apertured end flanges, the apertures in one flange being disposed opposite an unapertured part of the opposite flange, a cylindrical barrel and a cylindrical hub defining the central bore of the reel and strengthening webs extend between the barrel and the hub The bobbin is formed with the webs inclined to the axis of the bobbin to provide compartments having walls diverging from the closed ends between the barrel and the hub.

820,844 Card Stripping

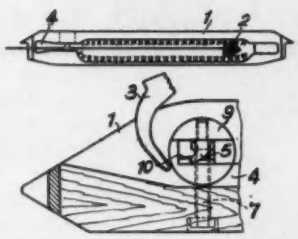
ABINGTON TEXTILE MACHINERY WORKS, *Abington, Massachusetts, U.S.A.*

A carding machine comprises a carding means, means for feeding stock, a doffer for removing carded stock from the carding means, take-off means for removing carded stock from the doffer, engageable and disengageable means for driving the take-off means and a stripper that traverses the doffer for stripping residual stock. The machine is equipped with the combination of timing means to cause, after the elapse of a predetermined time interval from the initiation of its operation, engagement of the driving of the take-off means, and means responsive to the completion of a stripping traverse of the stripper for causing engagement of the driving of the stock-feeding means and for initiating the operation of the timing means. By this combination, on completion of a stripping operation, the feeding means is immediately restarted and the take-off is started after the elapse of the predetermined time interval which will, in general, be sufficient for fresh carded stock to be built up upon the doffer and presented to the take-off.

821,008 Threading Means for Weft Thread in Shuttles

FIRMA C.C. EGELHAAF, *Reutlingen-Betzingen, Germany.*

A weft threading and guiding means for loom shuttles. In the shuttle 1 a cop is mounted, the remains 2 of which, after drawing off of the usable length of weft are removed automatically by the ejector hook 3. This hook enters into the weft channel 4 in the shuttle, whereby the spring-urged pawl 5 yields as the shuttle moves forward, and, after it has passed the hook it immediately returns into its original position. Upon the insertion of the new cop, the free end of which is

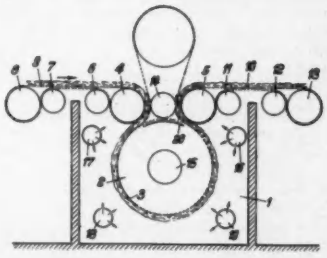


connected to the cop-changer, the free weft slides downwards along the outer surface of the pawl and becomes located in the channel below the pawl. The pawl is mounted on a bolt 7 which is carried by a bearing block 9 located in a recess of the shuttle wall, and the bolt is surrounded by a torsion spring 10, one end of which is fixed on the pawl and the other end is anchored against the bearing block. The spring is pre-loaded so that the pawl always returns again into the original position.

821,327 Improved Washing or Dyeing Machine

FLEISSNER AND SOHN, *Maschinenfabrik, Egelsbach-Frankfurt/Main, Wolfsgartenstrasse 6, Germany.*

A washing or dyeing machine for washing or dyeing loose and heavy material incapable of transmitting a longitudinal traction. The machine comprises a container 1 in which is mounted a washing drum 2 having a sieve jacket 3, the drum being driven from without. Two conveyor rollers 4 and 5 are disposed above the drum approximately symmetrical with respect to the vertical plane through the axis of the drum and at a small distance from the sieve jacket. Over the roller 4 runs a conveyor belt 9 guided by rollers 6, 7 and 8. A similar conveyor belt 10 is passed over the roller 5 and guided by rollers 11, 12 and 13, and the conveyor



belts are driven at a speed which corresponds to the peripheral speed of the drum. Between the rollers 4 and 5 is located a further roller 14, at such distance, that once between the rollers 4 and 14, the material is passed to the drum and then lifted off the drum between the rollers 5 and 14. The drum is provided at one of its ends with an exit aperture 15, to which is connected a suction pump. The washing liquid is passed to the container through pipes 16, 17, 18, 19. These pipes are provided with a number of rows of holes, which are so directed that the washing liquid passed in is distributed as uniformly as possible on to the material covering the sieve jacket 3. In order to prevent washing liquid from being sucked into the interior of the drum at those places where the sieve jacket is not covered by the material, a covering device 20 is provided inside the drum and fixed relative to the bath.

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